FEBRUARY 23, 1998 VOLUME 15, NUMBER 8

NetworkWorld

THE NEWSWEEKLY OF ENTERPRISE NETWORK COMPUTING



BUYER'S GUIDE

NETWORK SIMULATION TOOLS



Good managers are always on the lookout for ways to tweak their networks to enhance performance. But nobody wants to tinker by trial and error for fear of accidentally making things worse.

Network simulation and modeling tools can help you assess the effects of changes before you make them, but first you've got to assess which tool is best for your net.

Our Buyer's Guide to network simulation tools will show you what the current crop of tools can and can't do.



Review: Page 46.



Issues and Trends: Page 48.



Product Chart: Page 49.

A view into a network attack

Net administrator charged in $10M "logic bomb" case.

By Ellen Messmer
Bridgeport, Conn.

In one of the costliest reported acts of computer sabotage, an engineering company next month will prosecute its former network administrator for electronically destroying computer files that the company claims cost it about $10 million in sales.



Omega Engineering, Inc. is set to go to trial against Timothy Lloyd, the chief network program designer, who the company said planted a LAN-based logic bomb that went off after his job was terminated. The logic bomb wiped out all the files on the company's Novell, Inc. network-based servers.

What detonated the Omega bomb was not immediately clear.

Security experts said a logic bomb usually is a software program that, once activated by a specific date for example, eats through files or reformats hard drives. The bomber's intent is to hopelessly damage and erase data.

"[Logic bombs] can be as simple as a script that runs a bunch of delete commands," said Chris Byrnes, vice president for servers and systems management strategy

See **Bomb,** *page 16*

The rise and fall of NetTech

By Marc Songini
Raleigh, N.C.

Ellis Gregory is willing to take half the credit for the acrimonious demise of his promising software firm — but only half.

twisted technology tale

At a time when start-ups garner multimillion dollar buyout offers before they even ship their goods, the outright failure of a company with an innovative technology, powerful partners and high-profile users is unusual. And the story of "little NetTech," as Gregory used to call the company, is about as twisted as it gets.

Over a period of eight years, Gregory grew NetTech, Inc. from the ground up around a network management package called EView. He amassed 35 employees, partnered with Cisco Systems, Inc., Cabletron Systems, Inc. and Hewlett-Packard Co. and landed big customers such as Sara Lee Corp. and Food Lion, Inc.

Then things went south. In the fall of 1997 NetTech went bankrupt, leaving more than $1.3 million in debt and forcing Gregory to turn EView and NetTech over

See **NetTech,** *page 14*

Start-ups spark venture spending spree

By Chris Nerney

Venture investing in network technology start-ups topped the $1 billion mark for the first time in the fourth quarter of 1997, according to the latest Price Waterhouse/*Network World* Venture Capital Survey. The $1.03 billion invested in network companies comprised 41% of the $2.52 billion pumped into high-tech firms during the quarter.

Price Waterhouse/NetworkWorld VENTURE CAPITAL SURVEY

As was the case in the third quarter, the charge was led by a number of telecommunications firms seeking to capitalize on telecom reform and, of course, dozens of Internet upstarts.

On an annual basis, venture investments in telecom start-ups increased from $737 million in 1996 to $1.23 billion in 1997, while Internet funding rose from $872 million to $1.88 billion during the same period.

"Those two segments had far and away the biggest total funding increases in the survey over 1996," said Kirk Walden, Price Waterhouse Venture Capital Survey director.

In particular, telecom start-ups

See **Venture,** *page 61*

more online:
- The complete venture capital survey list from last quarter
- A similar compilation for the previous quarter

5931

www.nwfusion.com

IBM mainframes to get IP punch

By Marc Songini
Anaheim, Calif.

IBM's long and sometimes laborious effort to bring the mainframe fully into the TCP/IP world will take a big step today with a new release of the mainframe's OS/390 operating system.

At the Share Technical Conference here, IBM is expected to roll out OS/390 Version 2.5 software that includes a faster IP stack, improved IP support for IBM's parallel sysplex-based mainframes and new Internet security features. IBM declined to comment on the announcement.

See **IBM,** *page 14*



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InfoWorld February 2, 1998

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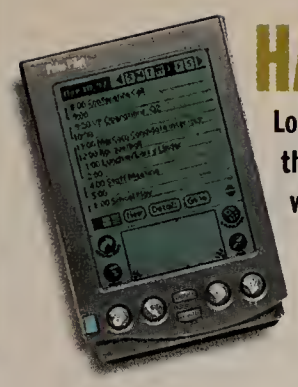
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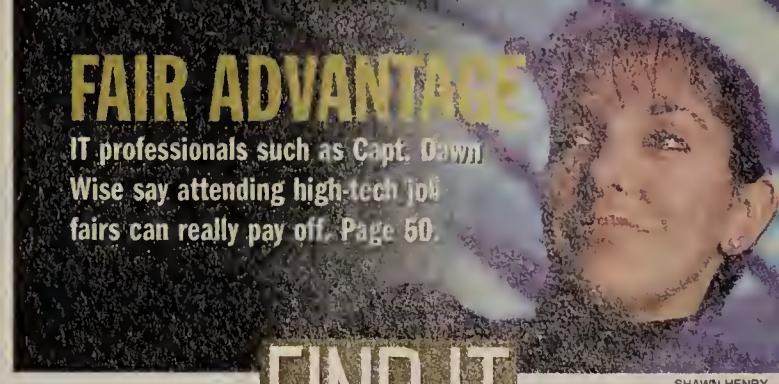
BALANCING ACT

NEC spinoff intros load-balancing devices for high-traffic sites. Page 10.



HANDY E-MAIL

Lotus and others are adapting their messaging products to work with PalmPilots and other handheld devices. Page 8.



FAIR ADVANTAGE

IT professionals such as Capt. Dawn Wise say attending high-tech job fairs can really pay off. Page 50.

SHAWN HENRY

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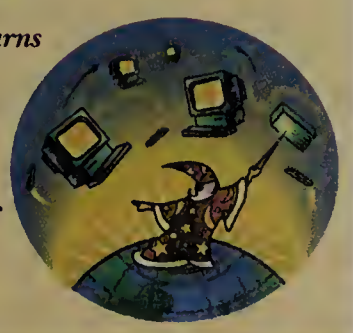
BUYER'S GUIDE

NETWORK SIMULATION TOOLS

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ISSUES AND TRENDS: *Simulation tools — varied as the LANs they model.* **Page 48.**

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TIM WEBB

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To quickly get to any online info referenced in *Network World*, enter its DocFinder number in the input box on the home page.

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This Week

Only on Fusion

Jumbo Frames. Can you get more life out of Ethernet by expanding its maximum frame sizes? This week, we post arguments from executives at Alteon Networks (pro) and Packet Engines (con). Give your opinions. Next week, the executives come online to debate each other and answer your questions. **DocFinder: 5916**

Training. Web-based training is beginning to explode in the marketplace. Veterans caution that it won't replace all in-person training, but it will find a niche for quick-hit on-the-job skills upgrades. **DocFinder: 5935**

OS/2. Last week, we ran a front-page article on how Lotus will not include OS/2 in its next round of Lotus Notes clients. Is this yet another sign that OS/2 is on the way out? Join our online debate. **DocFinder: 5936**

Careers. Have any suggestions for a 35-year-old who wants to switch from corporate audio-visual to a career in networking? Does Novell certification make sense? Help him out. **DocFinder: 5937**

From the front page

Read our story on logic bombs, then come online for more information about these and related programs. **DocFinder: 5932**

HOW TO GET ONTO NETWORK WORLD FUSION

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The Software Minute

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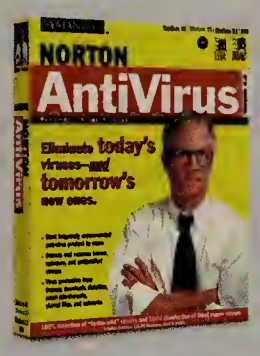
A bank transaction that costs $1.07 in person costs 54¢ by telephone. The same transaction can be executed on the Internet for 1¢. (Thanks to Dudley Nigg, Wells Fargo & Co., reported in *Computerworld* 12/29/97.)

FACT

News briefs, February 23, 1998

Symantec slapped with lawsuit

■ Symantec Corp. is the target of a class-action lawsuit filed last week in California. The suit alleges that the company is improperly requiring customers who bought Norton AntiVirus software prior to Version 4.0 to pay for upgrades that remedy the Year 2000 problem, according to lawyers for the plaintiffs.



Symantec's *Norton AntiVirus software: If you don't have this version, you may have to pay for Year 2000 remedy upgrades.*

The lawsuit, filed in the Superior Court of the State of California, County of Santa Clara, alleges breach of implied warranty and related claims in connection with what it calls "defective computer software" developed and sold by Symantec. Versions of Norton AntiVirus released prior to Version 4.0, which came out last September, can't recognize and process dates starting in the year 2000, the lawyers' statement said.

While other software companies are providing Year 2000-compliant fixes to their customers at no cost, Symantec is charging for upgrades to remedy what the lawsuit calls a defect, according to the statement from Milberg Weiss Bershad Hynes & Lerach LLP, of New York. Symantec officials could not be reached for comment.

Intel to ratchet up network offerings

■ Intel Corp. this week will try to make a big splash with announcements from its network products division and enterprise server group. The chip giant has confirmed that on Tuesday, in San Francisco, it will show Gigabit Ethernet products scheduled to hit the market by midyear. Gigabit Ethernet products expected to be on display include a network interface card, a module for the 10M/100M Express 510T Switch and a Layer 3 switch. Analysts also expect Intel to make announcements about server and network management technologies.

56K bit/sec modem leaders call a truce

■ The warring factions in the 56K bit/sec modem wars have buried the hatchet. 3Com Corp. and Rockwell Semiconductor last week said that their competing modem technologies now are compatible. Any 56K bit/sec modems bought before this interoperability agreement will have to be upgraded if their owners hope to use them at optimum speed with standard modems.

Rejected!

■ Computer Sciences Corp. (CSC) has rejected Computer Associates International, Inc.'s (CA) offer to buy the services and consulting company for roughly $9.5 billion. CSC said the proposal would not properly reward CSC shareholders and that any effort to combine the companies would not make business sense. CSC said it would use "every legal means necessary" to thwart CA's acquisition attempt. CA said it will proceed with its $108-per-share tender offer to CSC shareholders.

Microsoft and the ISPs

■ Microsoft Corp. last week downplayed the market significance of the company's cross-promotional agreements with Internet service providers. The software giant was responding to reports that the U.S. Department of Justice has sent civil subpoenas to America Online, Inc. (AOL), MCI Communications Corp. and other ISPs in connection with its case against Microsoft. MCI and AOL confirmed they had received subpoenas, but declined further comment.

The Justice Department is looking into the various ways Microsoft distributes its Internet Explorer Web browser and is focusing on whether the ISPs agreed to favor Internet Explorer over software from Microsoft rival Netscape Communications Corp. The subpoenas were issued as part of the Justice Department's investigation into whether Microsoft uses Windows operating system software to boost distribution of its Web browser.

IP telephony backers fight FCC fees

FCC launches auction for wireless local access amid ISP access fee controversy.

By David Rohde and Denise Pappalardo
Washington, D.C.

Internet service providers and Internet telephony advocates last week fought back against a renewed effort that would force them to pay fees to support universal telephone service.

Their tactic: Fight claims that IP telephony is about to take over the world.

At a Federal Communications Commission hearing, IP telephony champions avoided labeling circuit-switched voice a threatened commodity.

The hearing took place even as the FCC was kicking off an auction for wireless spectrum for yet another alternative telecom service: wireless local-loop bypass.

The FCC must report to Congress by April 10 about the possibility of ISPs contributing to the nation's universal service fund, which subsidizes the addition of phone lines in rural and other hard-to-reach communities. The report was demanded by senators in largely rural states. They fear universal service support may dry up if Internet usage swamps traditional telecom carriers, who contribute to the universal service fund.

As a result, Jeff Pulver, president of Pulver.com, Inc. and chairman of the Voice on the Net (VON) Coalition, at the hearing avoided sweeping predictions of an IP telephony takeover.

Pulver downplayed the current ability of ISPs to carry vast volumes of voice traffic. He told the five FCC commissioners that most IP telephony platforms support only one to 24 ports, while large PBXs and central office telephone switches routinely support 10,000 ports or more.

TOP 5 LMDS LICENSE BIDDERS

WNP Communications	$135.8 million
US WEST	$7.9 million
Vanguard LMDS	$7.3 million
Eclipse	$6.1 million
Actel	$5.1 million

Oddly enough, at the hearing representatives of the traditional telecom industry worked just as hard to claim that IP telephony does present a clear and present threat to circuit-switched voice.

Earl Comstock, a private Washington, D.C. attorney, quoted WorldCom, Inc. Vice Chairman John Sidgmore's statement that by 2008, traditional voice circuit-switching will constitute only 1% of wide-area traffic. "Under the [FCC's] current policies, that 1% will have to bear the entire cost of universal service," Comstock said.

The commissioners kept their cards close to the vest. Commissioner Michael Powell ex-pressed concern about forcing a "mountain of regulation" on ISPs if they were to be treated as common carriers.

In other activity last week, the FCC kicked off its latest auction for the wireless Local Multipoint Distribution Service (LMDS) spectrum. The first round of bidding ended the day with gross revenues amounting to $322.5 million. WNP Communications, Inc., an unknown telecommunications newcomer, was the high bidder of the day, with its bids amounting to $135.7 million (see graphic).

LMDS licenses are being divvied up into 1.3-GHz chunks that can support transmission rates up to 1G bit/sec. ■

Oracle NC group gets new boss

By John Cox
Redwood Shores, Calif.

The man handpicked by Oracle Corp. Chairman Larry Ellison to lead the charge for network computers (NC) has turned in his uniform.

Jerry Baker, CEO of Oracle's Network Computer, Inc. (NCI) subsidiary here, last week was replaced by David Roux, who will remain Oracle's executive vice president of corporate development. Roux has served on NCI's board and arranged the Navio Communications, Inc. merger.

NCI also announced that its president, Wei Yen, has stepped down. According to an NCI spokesman, Baker agreed with the board of directors that NCI, created in May 1996, now needs a leader with stronger sales and marketing experience.

Before being tapped by Ellison for the NCI post, Baker was senior vice president for Oracle's product and platform technologies division.

Oracle does not publicly break out NCI's financials, so it's difficult to say if the subsidiary is making money. But one sign that NCI may not be living up to Oracle's expectations is that the subsidiary reorganized in December, laying off about 30 of its 200 employees.

"The development stage at NCI is ending," said Peter Kastner, analyst with Aberdeen Group, Inc., a technology research company in Boston. "At this point, Oracle needs to turn [NCs] into corporate and consumer mass market devices."

The company shepherded the development of the Network Computer Reference Profile and created client and server NC software packages that it licenses to companies building NCs. ■



Handheld devices are delivering more e-mail

EasySynch 2 for Lotus Notes is the latest electronic messaging product aimed at PalmPilot users.

By Paul McNamara

Lotus Notes users who carry 3Com Corp. PalmPilots on the road now are able to manage their office e-mail using the six-ounce handheld device instead of a bulkier laptop.

With its release last week of EasySynch 2 for Lotus Notes, Lotus Development Corp. added its flagship offering to a growing list of products that cater to handheld device users who want to exchange e-mail as well as manage personal information.

EasySynch is PC-based software that allows a user to synchronize calendars, schedules, tasks, contacts and, with this release, e-mail between Notes or Lotus Organizer and the PalmPilot or IBM's WorkPad handheld devices. Similar products are available to link the increasingly popular PalmPilots and other handhelds to e-mail packages such as Microsoft Corp.'s Exchange, Novell, Inc.'s GroupWise and Qualcomm, Inc.'s Eudora Pro.

Not even those who sell handheld devices dare to compare the e-mail experience on them to that of a PC or laptop. With no keyboard on the PalmPilot, for example, inputting messages can be difficult. In addition, storage capacity is limited to 1M byte, and remote synchronization with the office PC, which must be turned on, requires a special modem.

WHAT HANDHELD USERS WANT

These are the most important applications for handheld devices, according to a survey of 621 users:

1. Calendaring and scheduling
2. Managing contact information
3. Creating to-do lists
4. Sending or receiving e-mail
5. Accessing remote PCs, files or databases

SOURCE: IDC, FRAMINGHAM, MASS.

However, with PalmPilot sales well over 1 million and corporations starting to dispense various handhelds to their work forces as standard equipment, vendors said they are being swamped with calls for better e-mail synchronization capabilities.

In the coming months, 3Com is expected to release a new version of PalmPilot that will store 4M bytes of data. In addition, a group of Microsoft partners, including Philips Mobile Computing Group, Samsung Electronics America, Inc. and Casio, Inc., soon will roll out Windows CE-based PalmPCs that take aim at 3Com's undisputed market leadership.

"These devices are real business productivity tools," said Diana Hwang, an analyst with International Data Corp., in Framingham, Mass. "As such, users want the ability to read and respond to e-mails from a handheld so that they do not have to lug around a notebook."

Not everyone will settle for a handheld's limited e-mail functionality, of course, but finding those who judge them good enough is not difficult. Richard Samson, an IT manager for a large accounting and consulting firm, said employees at his company increasingly are relying on PalmPilots for mobile access to their e-mail.

"In fact, some of our users are giving up their laptops," Samson said. "They have a desktop in the office and [one] at home, and a PalmPilot for in between."

Another PalmPilot user reported a similar experience.

"We are using them in place of laptops," said Ken Fuerstenhaefer, a senior technician with Quantum Computing, in Chicago. "We have found that we can do everything we really need to do on the road with the PalmPilot Professional, [although] we do still have two laptops for use on presentations."

But some users complained that the limited storage capacity of handhelds precluded them from using the devices for routine on-the-road e-mail.

And handhelds need to gain more than remote e-mail access capabilities before they replace laptops, said David Archer, a consultant with London-based Sherwood International.

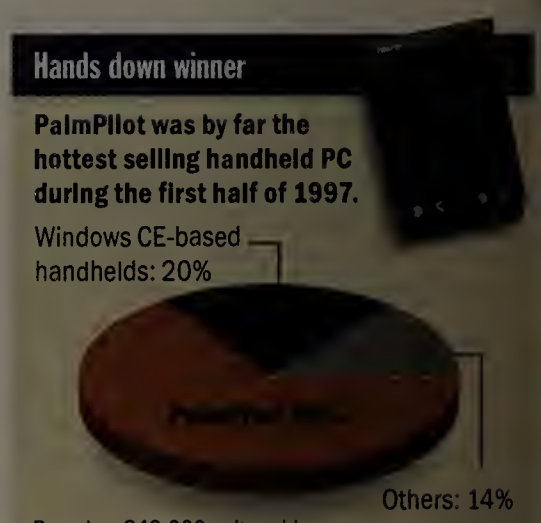
Such concerns aside, the growing popularity of handhelds has prompted software vendors such as Lotus and Microsoft to make sure their messaging products play well with the devices.

"For the first time, we are seeing our typical customers — the Coca-Colas and Pepsis of the world — call and say, 'We have decided to standardize on these [handheld] devices now,' " said Arthur Gehring, a senior product manager at Lotus. "They're interested in advanced functions, and they're interested in leveraging their [e-mail infrastructure] investment."

While products such as EasySynch are designed for PC-to-PalmPilot synchronization, Lotus and other vendors are working on server-side links, too. This would allow handheld users to tap into the richer resources of products such as Lotus' Domino Web application server. According to Gehring, Lotus or one of its business partners could deliver such a product later this year. ■

Hands down winner

PalmPilot was by far the hottest selling handheld PC during the first half of 1997.



Based on 842,000 units sold.

SOURCE: DATAQUEST, SAN JOSE, CALIF.



Protecting your network from security threats is one thing, but how secure is your information? The fact is, in typical organizations, valuable information is extremely vulnerable to threats from the outside and inside.

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Form: 9703

1 What is the principal business activity at your location? (check one only)

01. ☐ Manufacturing (other)
02. ☐ Finance/Banking
03. ☐ Insurance/Real Estate/Legal
04. ☐ Health Care Services
05. ☐ Hospitality/Entertainment/Recreation
06. ☐ Media/TV/Cable/Radio/Print
07. ☐ Retail/Wholesale Trade/Business Services
08. ☐ Transportation
09. ☐ Utilities
10. ☐ Education
11. ☐ Process Industries (Mining/Construction/ Petroleum Refining/Agriculture/Forestry)
12. ☐ Government (Federal/State/Local)
13. ☐ Military
14. ☐ Aerospace
15. ☐ Consulting (Independent)*
16. ☐ Carriers/Interconnects
17. ☐ Internet Service Provider (ISP)
18. ☐ Manufacturing (Computer/Communications/OEM)
19. ☐ Resellers of Computer/Network Products (VARs, VADs)
20. ☐ Systems/Network Integrators*
21. ☐ Distributors (Computer/Communications)*
22. ☐ Other *(please specify)* _____

Please complete form based on largest client.

2 What is your job function? (check one only)

NETWORK MANAGEMENT:

1. ☐ Network Management
2. ☐ LAN Management
3. ☐ Datacom/Telecom Management
4. ☐ IS, IT, MIS, CIO, Systems Management
5. ☐ Internet/Intranet Management/Webmaster
6. ☐ Engineering Management
7. ☐ Corporate Management (CEO, Pres., VP, Dir., Mgr., Financial Management)
8. ☐ Consultant (Independent)
9. ☐ Other *(please specify)* _____

3 What is the estimated value of Network equipment and services that you specify, recommend or approve the purchase of? (Please **print** the appropriate **number code** in the box next to each product category. Please complete ALL categories A-M.)

9. $100 Million or More
0. $50 Million to $99.9 Million
2. $25 Million to $49.9 Million
3. $10 to $24.9 Million
4. $1 to $9.9 Million
5. $100,000 to $999,999
6. $50,000 to $99,999
7. Under $50,000
8. None of the above

A ☐ Large Systems *(Mainframes/Minis)*
B ☐ Desktops *(Micros/Laptops/Workstations)*
C ☐ Servers
D ☐ LANs
E ☐ WAN Equipment
F ☐ Carrier Services
G ☐ Internetworking
H ☐ Internet
I ☐ Intranet
J ☐ Remote Access
K ☐ Peripherals
L ☐ Software
M ☐ Service/Support

4 What is the total number of sites for which you have purchase influence? (check one only)

1. ☐ 100+ 2. ☐ 50 - 99 3. ☐ 20 - 49 4. ☐ 10 - 19 5. ☐ 2 - 9 6. ☐ 1 7. ☐ None

5 What is the total number of Servers/Clients/LANs installed/planned at your location/in your entire organization? (Check one box in each column)

	SERVERS		CLIENTS		LANS	
	At Location A	Entire Org. B	At Location C	Entire Org. D	At Location E	Entire Org. F
1.	50,000+		50,000+		50,000+	
2.	10,000 to 49,999		10,000 to 49,999		10,000 to 49,999	
3.	1,000 to 9,999		1,000 to 9,999		1,000 to 9,999	
4.	100 to 999		100 to 999		100 to 999	
5.	50 to 99		50 to 99		50 to 99	
6.	10 to 49		10 to 49		10 to 49	
7.	1 to 9		1 to 9		1 to 9	
8.	none		none		none	

6 What is your scope and involvement in purchasing decisions for network products and services for your enterprise?

A. Scope (check one only)
1. ☐ Corporate/Enterprise
2. ☐ Department
3. ☐ None

B. Involvement (check ALL that apply)
1. ☐ Create Network Strategy
2. ☐ Recommend/Specify
3. ☐ Approve
4. ☐ Evaluate
5. ☐ Determine the need
6. ☐ None

7 What is the estimated number of employees at your location/in entire organization? (check one in each section)

A. At your location:
1. ☐ Over 20,000
2. ☐ 10,000 - 19,999
3. ☐ 5,000 - 9,999
4. ☐ 2,500 - 4,999
5. ☐ 1,000 - 2,499
6. ☐ 500 - 999
7. ☐ 499 or less

B. Entire organization:
1. ☐ Over 20,000
2. ☐ 10,000 - 19,999
3. ☐ 5,000 - 9,999
4. ☐ 2,500 - 4,999
5. ☐ 1,000 - 2,499
6. ☐ 500 - 999
7. ☐ 499 or less

8 Please indicate the products/services that you are currently involved in purchasing or plan to purchase: (Check ALL that apply)

	A. Currently involved in purchasing	B. Plan to purchase
INTERNET/INTRANET		
01.	☐ Internet Services	☐
02.	☐ Firewalls/Security/Encryption	☐
03.	☐ Internet Web Servers	☐
04.	☐ Intranet Web Servers	☐
05.	☐ TCP/IP Software	☐
06.	☐ Management/Monitoring Software	☐
07.	☐ Push Technology	☐
08.	☐ Web Browsers	☐
09.	☐ Intranet Applications/Groupware	☐
10.	☐ Search/Retrieval Products (web crawler)	☐
11.	☐ Internet Development Tools (JAVA, ActiveX, etc.)	☐
12.	☐ Electronic Commerce Tools	☐
13.	☐ Internet Telephony	☐
LOCAL-AREA NETWORKS		
14.	☐ Local-Area Networks	☐
15	☐ Network Operating System Software	☐
16.	☐ Servers	☐
17.	☐ Print Servers	☐
18.	☐ ATM Switches	☐
19.	☐ Token-Ring Switches	☐
20.	☐ Ethernet Switches	☐
21.	☐ Fast Ethernet	☐
22.	☐ Gigabit Ethernet	☐
23.	☐ IP Switches	☐
24.	☐ LAN Storage/Backup	☐
25.	☐ Optical LAN Storage/Backup	☐
26.	☐ Disk LAN Storage/Backup	☐
27.	☐ Tape LAN Storage/Backup	☐
28.	☐ RAID LAN Storage/Backup	☐
29.	☐ Network Test/Diagnostic Tools	☐
30.	☐ Cables, Connectors, Baluns	☐
31.	☐ UPS	☐
32.	☐ Network Interface Cards	☐
33.	☐ SNMP Network Management	☐
INTERNETWORKING		
34.	☐ Routers	☐
35.	☐ Hubs	☐
36.	☐ Intelligent Hubs	☐
37.	☐ Stackable Hubs	☐
38.	☐ Bridge/Router	☐
39.	☐ Bridges	☐
40.	☐ Gateways	☐
41.	☐ Concentrators/Repeaters	☐
COMPUTERS/PERIPHERALS		
42.	☐ Network Computers	☐
43	☐ Laptops/Notebooks/Sub-Notebooks	☐
44.	☐ Micros/PCs	☐
45.	☐ Minis	☐
46.	☐ Mainframes	☐
47.	☐ Workstations	☐
48.	☐ Printers/Network Printers	☐
49.	☐ CD-ROM	☐
50.	☐ Fax/Modem Boards	☐
51.	☐ Graphics/Multimedia/Audio/Video Boards	☐
52.	☐ Memory/Chips/Boards/Cards	☐
REMOTE/WIRELESS COMPUTING		
53.	☐ Remote Access Products	☐
54.	☐ Remote Access Services	☐
55.	☐ PDAs	☐
56.	☐ PCMCIA Devices	☐
57.	☐ Wireless Data Services	☐
58.	☐ Wireless Data Equipment	☐
59.	☐ Cellular Equipment & Services	☐
SOFTWARE/APPLICATIONS		
60.	☐ Network Management	☐
61.	☐ Systems Management	☐
62.	☐ Security	☐
63.	☐ Communications Software	☐
64.	☐ Terminal Emulation	☐
65.	☐ Operating Systems	☐
66.	☐ Applications Development Tools	☐
67.	☐ Database Management/RDBMS	☐
68.	☐ Groupware	☐
69.	☐ Workflow	☐
70.	☐ EDI	☐
71.	☐ E-mail	☐
72.	☐ Desktop Video Conferencing	☐
73.	☐ Imaging	☐
74.	☐ Suites/Server Suites (Back Office, etc.)	☐
75.	☐ Middleware	☐
76.	☐ Document Management	☐
77.	☐ Site Metering Tools	☐
78.	☐ Computer Telephony Integration (CTI)	☐
79.	☐ Data Warehousing	☐
WIDE-AREA NETWORK EQUIPMENT & SERVICES		
80.	☐ Modems	☐
81.	☐ Asynchronous Transfer Mode (ATM)	☐
82.	☐ Frame Relay Equipment/Services	☐
83.	☐ ISDN Equipment & Services	☐
84.	☐ FT-1/T-1/T-3 Multiplexers/Services	☐
85.	☐ DSL Services/Products	☐
86.	☐ SONET	☐
87.	☐ Inverse Multiplexers	☐
88.	☐ SMDS	☐
89.	☐ Diagnostic/Test Equipment	☐
90.	☐ DSU/CSU	☐
91.	☐ VSAT/Satellite	☐
92.	☐ PBXs	☐
93.	☐ Voice Mail/Response	☐
94.	☐ Videoconferencing	☐
95.	☐ Leased Lines	☐
96.	☐ Switched Data	☐
97.	☐ Virtual Networks	☐
98.	☐ Outsourcing/Systems Integration Services	☐
99.	☐ Education/Training Services	☐
00.	☐ None of the above (1 - 99)	

9 Please indicate the platforms that are currently installed/planned:

(Check ALL that apply) A. Currently installed B. Planned for purchase

	NETWORK PROTOCOLS A	B	NETWORK OPERATING SYSTEM A	B
01.	☐ TCP/IP	☐	☐ Windows NT	☐
02.	☐ IPv6	☐	☐ Windows NT/Advanced Server	☐
03.	☐ SNA	☐	☐ Novell IntranetWare	☐
04.	☐ DECnet	☐	☐ Novell (NetWare 4.X)	☐
05.	☐ Novell IPX/SPX	☐	☐ Novell (NetWare 2.X, 3.X)	☐
06.	☐ APPC/APPN/LU 6.2	☐	☐ Microsoft (LAN Manager)	☐
07.	☐ NETBIOS	☐	☐ LocalTalk (AppleTalk)	☐
08.	☐ AppleTalk	☐	☐ Banyan (VINES)	☐
09.	☐ NFS	☐	☐ IBM (LAN Server)	☐
10.	☐ Other *(please specify)* _____	☐	☐ Artisoft (LANtastic)	☐
	LAN ENVIRONMENT		☐ Other *(please specify)* _____	☐
	A	B	**COMPUTER OPERATING SYSTEM**	
11.	☐ Gigabit Ethernet	☐	A	B
12.	☐ Switched Ethernet	☐	☐ NT Server	☐
13.	☐ Fast Ethernet (100 Megabit Ethernet)	☐	☐ NT Workstation	☐
14.	☐ Ethernet	☐	☐ Unix/Xenix/AIX	☐
15.	☐ ATM	☐	☐ Solaris	☐
16.	☐ Token Ring/Token Ring Switching	☐	☐ Windows	☐
17.	☐ IP Switching	☐	☐ Windows 95	☐
18.	☐ FDDI	☐	☐ Windows 97	☐
19.	☐ 100Base-T	☐	☐ DOS	☐
20.	☐ 10Base-T	☐	☐ OS/2/OS/2 Warp	☐
21.	☐ LocalTalk	☐	☐ IBM MVS/VM/VSE	☐
22.	☐ Fibre Channel	☐	☐ Digital VMS	☐
23.	☐ 100vg Any LAN	☐	☐ Macintosh	☐
24.	☐ Other *(please specify)* _____	☐	☐ Other *(please specify)* _____	☐
			☐ 49. ☐ None of the above (1-48)	

10 Which of the following Servers/Clients do you have installed/planned at your location? (check ALL that apply in each column)

	A. Servers		B. Clients			A. Servers		B. Clients	
Power PC	☐	01.	☐		486	☐	07.	☐	
Power Mac	☐	02.	☐		386	☐	08.	☐	
Mac Other	☐	03.	☐		286	☐	09.	☐	
Muttiprocessor Servers	☐	04.	☐		Risc	☐	t0.	☐	
PG/P1t	☐	05.	☐		Alpha	☐	1t.	☐	
Pentium/Pentium Pro	☐	06.	☐		Other	☐	12.	☐	

11 Which of the following hardware platforms are installed/planned in your company? (check ALL that apply)

A - Mainframes (Large Scale) Installed/Planned
1. ☐ IBM
2. ☐ Amdahl
3. ☐ Cray
4. ☐ Hitachi
5. ☐ Unisys
6. ☐ Other _____

B - Minis (Midrange) Installed/Planned
1. ☐ IBM RS6000
2. ☐ IBM AS400
3. ☐ Digital
4. ☐ Tandem
5. ☐ Unisys
6. ☐ AT&T GIS
7. ☐ H-P
8. ☐ Data General
9. ☐ Other _____

C - Workstations Installed/Planned
1. ☐ Sun Microsystems
2. ☐ Silicon Graphics
3. ☐ Digital
4. ☐ H-P
5. ☐ IBM
6. ☐ Other _____

12 What is the estimated gross annual revenue of your entire company/ institution? (check one only)

01. ☐ $20 billion or more
02. ☐ $10 billion to $19.9 billion
03. ☐ $1 billion to $9.9 billion
04. ☐ $500 million to $999.9 million
05. ☐ $100 million to $499.9 million
06. ☐ $50 million to $99.9 million
07. ☐ $10 million to $49.9 million
08. ☐ $5 million to $9.9 million
09. ☐ $4.9 million or less
10. ☐ None of the above

13 For which areas outside of North America do you have purchase influence? (check ALL that apply)

1. ☐ Europe 2. ☐ Asia 3. ☐ South America 4. ☐ Australia 5. ☐ Middle East 6. ☐ None

B298

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In-Site

Mortgage business gives approval to Gigabit Ethernet

By Robin Schreler Hohman
Horsham, Pa.

GMAC Commercial Mortgage has become an early Gigabit Ethernet user for one simple reason: Chief Information Officer Niraj Patel doesn't ever want to have to tell the organization's president that network bandwidth is running out.

Patel's game plan is to boost his organization's network capacity before bottlenecks appear.

Given the rate of growth at this General Motors Corp. business — GMAC Commercial Mortgage's portfolio has exploded from $2 billion in 1994 to $46 billion — Patel anticipates network traffic to skyrocket.

"[We went with Gigabit Ethernet because] I know I would have gotten into performance situations as the year went on," he said.

The financial division can't afford for its network to choke or go down.

One study showed that GMAC Commercial Mortgage could lose up to $18 million per hour if its trading desk — where financial traders hedge against interest rates and other risks with the company's loans — loses network access.

Taking the gigabit gamble

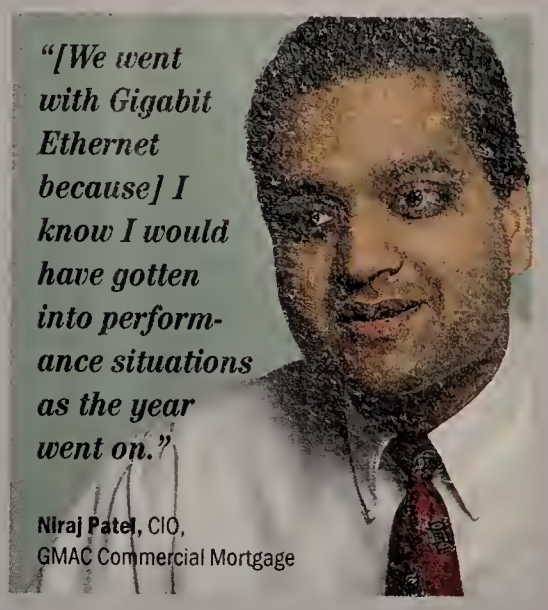
About two months ago, Patel kicked off his organization's Gigabit Ethernet implementation by replacing the 3Com Corp. 10M/100M bit/sec SuperStack II Switch 3000 that anchored GMAC Commercial Mortgage's campus backbone here with a Gigabit Ethernet SuperStack Switch II 9000 SX. The new device gave Patel eight Gigabit Ethernet ports, though he's only using four for now.

The 9000 connects to three 3000 switches in the same building. Each of the 3000s is linked via fiber to a different 3000 in each of four other buildings. The 3000s in these buildings are tied to SuperStack II 100 Hubs, which each support workgroups of 12 PC users.

In the next two months, Patel will deploy seven of the stackable 9000 switches: three in the backbone and one more in each building.

At that point, he'll replace the 3000s with the 9000s and the hubs with the 3000s, resulting in 18 new Gigabit Ethernet server links and switched 100M bit/sec to the desktop.

The migration so far has been "almost idiot-proof," Patel said. All he had to do to make the 3000s ready to feed into the 9000s was slide in a SuperStack II Switch Gigabit Ethernet SX Module. Each module features 12 10M/100M bit/sec ports and a Gigabit Ethernet uplink port.



From the start, Patel was able to plan his network to be Ethernet only, but he's not sure whether users with heterogeneous networks will find their Gigabit Ethernet upgrade paths as smooth.

Three years ago Patel got to do what every network manager dreams of: he tossed out everything and started over. He gets to do the same whenever his organization acquires another company with a different network setup.

The old network was a hodgepodge of topologies, network protocols and outdated cabling. The current network runs only IP traffic and is based on Ethernet of various speeds.

So far, so good

Since upgrading to Gigabit Ethernet, Patel hasn't noticed a difference in network response time. Then again, he said the 100M bit/sec backbone wasn't showing any strain.

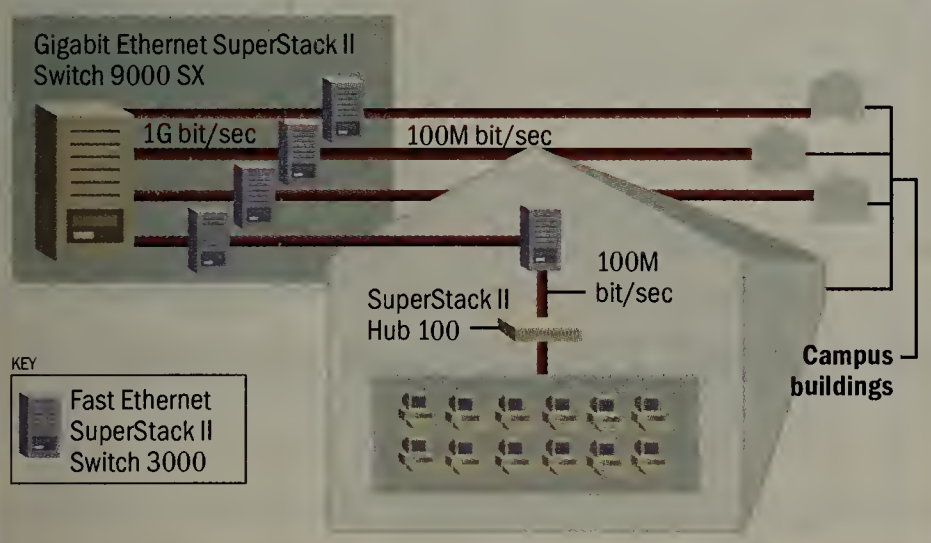
Even though the official IEEE Gigabit Ethernet standard isn't set yet, Patel said he feels comfortable with the technology. "I'm sure when [the standard] does get set, everybody will comply with it," he said.

Patel's only frustration so far with moving to Gigabit Ethernet is that it's hard to find network interface cards (NIC) based on the high-speed technology.

Alteon Networks, Inc. and Packet Engines, Inc. are about the only companies shipping Gigabit Ethernet NICs, although 3Com plans to join that elite group this month. ■

INVESTING IN GIGABIT ETHERNET

GMAC Commercial Mortgage has installed a 3Com 9000 Gigabit Ethernet switch at the center of its backbone to ensure that bandwidth won't dry up. The company plans to install seven more 9000s across its campus net.



Tivoli bolsters data management offerings

New and revised software addresses storage management, security and more.

By Jim Duffy
Austin, Texas

Tivoli Systems, Inc. last week unveiled a slew of software designed to help users better manage IBM data centers.

The new and revised products all run on IBM OS/390-based mainframes and address tasks such as job scheduling, storage management and software distribution.

In addition, they feature a Web-based graphical user interface (GUI) and integration with Tivoli's client/server management tools and third-party applications.

Tivoli currently offers TME 10 NetView for OS/390, which allows users to manage data centers and distributed systems from one console.

The company also provides tools for performance reporting and operations planning and control for the OS/390 environment.

The new and upgraded offerings include the following:

- TME 10 Performance Reporter for OS/390, Accounting Option, which lets users calculate the cost of IT resource utilization for charge-back to customers.
- TME 10 Performance Reporter for OS/390 1.3, which is a repository of IT utilization statistics for performance reporting, capacity management, service-level management and accounting. Version 1.3 includes performance information on IBM's MQ Series middleware and Lotus Domino data.
- TME 10 Operations Planning and Control 2.1, which lets users centrally administer workload management across data centers and distributed systems.
- TME 10 Information/Management 1.1, which features an Open Database Connectivity-compliant repository of hardware and software configuration information.
- TME 10 Module for MQ Series, which automates deployment, monitoring and administration of message-based applications.
- TME 10 NetView Performance Monitor 2.4, which collects net statistics and displays them via a GUI.
- OS/390 Security Server 2.4, which allows companies to connect OS/390 systems to the Internet securely.
- Data Facility Storage Management Subsystem (DFSMS) Optimizer 1.2 and DFSMS Removable Media Manager, which allow users to adjust storage management parameters from Java-based Web browsers and more easily integrate third-party job schedulers.

Tivoli's OS/390 management products are priced according to system configuration. They are available now.

✆ Tivoli: (800) 284-8654

CORRECTION

A recent story on Hewlett-Packard Co.'s service management strategy (*NW*, Feb. 16, page 17) incorrectly identified the president of the HP OpenView Forum user group. The president of OpenView Forum International is Sandra Potter of Air Products and Chemicals, Inc., of Allentown, Pa.

NEC spinoff targets server load balancing

HolonTech takes a hardware/software approach, uses patented algorithm with HyperFlow device.

By Andy Eddy
San Jose, Calif.

HolonTech Corp., a company that was started with the backing of NEC Corp., last week unveiled a line of server/router load balancers for high-traffic sites, such as large intranets and Internet service providers.

With Web traffic skyrocketing, more companies are relying on clusters of replicated servers to handle the load. As a result, load balancing is a growing market. Cisco Systems, Inc., Alteon Networks, Inc., and Bright Tiger Technologies are a few of the companies bringing out products that focus on or include load-balancing technology.

HolonTech created its HyperFlow devices from the ground up to provide intelligent — and, in its words, "server-centric" — load balancing. Whereas other products typically rely on software to accomplish balancing, HolonTech uses a mix of hardware, software and patent-pending algorithms.

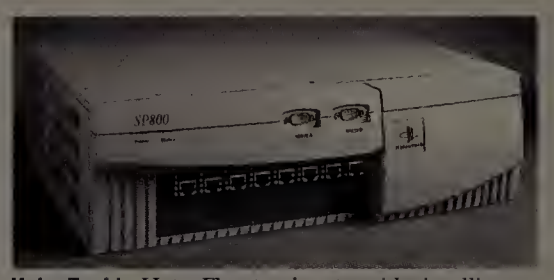
According to Martin Marshall, an analyst with Redwood City, Calif.-based Zona Research, Inc., load balancers translate domain names or IP addresses in order to route traffic among devices in a cluster. Often the balancing is sequential, sending requests in round-robin fashion equally to all servers without analyzing the ability of each server to receive traffic.

HyperFlow enables network administrators to designate all servers in a cluster with the same IP address, a process that offers faster balancing and more scalability than competing products.

The 16-port device will offer "cascading," a method that permits multiple HyperFlows to be grouped and provides for a cluster of up to 225 servers and routers.

Intelligent monitoring of the cluster also ensures that if one server can handle twice as much traffic as the others, it will receive twice as many of the incoming requests.

HyperFlow offers various methods of handling traffic. The load balancer can adjust balancing based on its monitoring of the data flow to and from each port, or administrators can manually adjust the weighting on each server. HyperFlow also tracks the functionality of servers and routers and can isolate nonworking devices.



HolonTech's *HyperFlow product provides intelligent load balancing.*

HolonTech claims its approach offers more security than other products because it works on Layer 3 data rather than Layer 4. At Layer 4, encrypted information must be decrypted before it can be routed.

HyperFlow doesn't need to decrypt the data, so it not only processes faster, but also assures that data-sensitive sites will be able to maintain point-to-point security.

GlobalCenter, Inc., a company that offers Web-hosting services for Yahoo and Playboy, among others, has beta-tested the product in a lab setting and with customers.

Jonathan Heiliger, GlobalCenter's chief technology officer, claimed that he has yet to find HyperFlow's limits.

"Cisco's Local Director broke at about 40 megabits of traffic, though it's not likely due to the actual traffic, but rather to the quantity of requests. We've taken HyperFlow past that point," Heiliger said.

HolonTech claims that HyperFlow can handle more than 6,500 transactions/sec.

HolonTech, started by former employees of Japan-based NEC with their company's blessing, was privatized in 1996 with the belief that a smaller, focused company could bring a product to market faster and with more innovations.

Zona's Marshall agreed, but saw a different outcome. "[HolonTech has] come up with something new and interesting. That also makes it a possible acquisition target to someone with more reach," he said.

The eight-port SP800 and the 16-port XP1600 are priced at $17,995 and $24,995, respectively. The SP800 is available now, while the XP1600 is targeted for a March release.

✆ HolonTech: (408) 369-4600

Shiva snaps up Isolation to gain VPN toehold

By Tim Greene
Bedford, Mass.

Shiva Corp. last week agreed to acquire Isolation Systems, Ltd. for $37 million, capturing key technology Shiva needs to help customers build corporate virtual private networks (VPN).

With Isolation's InfoCrypt hardware and software integrated with Shiva's direct dial-up access gear, Shiva will be able to offer users two remote access options that together will let remote users dial in toll free.

PROFILE: ISOLATION SYSTEMS, LTD.

Headquarters: Toronto
Founded: 1979
Employees: 35
Revenues: Privately held
Business: VPN hardware and software
Competitors: VPNet Technologies, CheckPoint and New Oak/Bay Networks

The first option is direct dial over the public phone network, which is Shiva's historic area of expertise. That option is for users calling from within the local calling area with no per-minute charge. Direct dialing is more secure than going over the Internet and offers lower latency.

Isolation's InfoCrypt network gateway will enable remote users outside the local calling area to avoid toll calls by using the Internet as a long-distance link. The user dials a local Internet service provider point of presence, establishes a tunneled session with an Isolation VPN gateway and gains access to corporate network resources.

Besides the gateway, the InfoCrypt package includes client software for Windows platforms, hardware-based support for the digital encryption standard (DES) and triple DES encryption, a firewall and certificate authority authentication. The combination of these makes it possible to secure Internet links.

Initially, the InfoCrypt gateway and Shiva LANRover remote access switch will be sold separately. Authentication will be performed by a separate Remote Authentication Dial-In User Service server. An integrated hardware platform may come later, Shiva said.

Before year-end, a unified configuration, authentication and monitoring software platform will be available as well. Shiva would not say whether the VPN platform would be marketed by Northern Telecom, with which Shiva has other comarketing agreements.

While the Isolation deal strengthens Shiva's product offerings, a long-term rumor persisted last week that the company might be bought by Nortel.

✆ Shiva: (617) 270-8810

Novell and IBM bolster LAN-to-host gateway

New version features more TCP/IP capabilities and can handle twice as many clients.

By Christine Burns
Provo, Utah

IBM and Novell, Inc. last week announced a new version of their LAN-to-host connectivity software that includes enhanced TCP/IP support and can handle twice as many client connections.

IntranetWare for Systems Application Architechture (SAA) 3.0 for the first time supports the Service Location Protocol (SLP), which simplifies how client machines discover IntranetWare for SAA gateways on TCP/IP networks.

Novell has been pushing to make all of its products that use the company's proprietary IPX transport protocol work with TCP/IP.

A major benefit of SLP is that it consumes significantly less network bandwidth than does Novell's own IPX-based Service Advertisement Protocol.

"This will be critical for companies that want to provide host connectivity over wide-area links in the future, because it will cut down on the price of maintaining those connections," said David Holbrook, a Novell product manager.

Additionally, Holbrook said third-party vendors can build load-balancing applications on top of SLP that tie gateways together. This would provide fault tolerance for tn3270 and TCP/IP client connections should a clustered gateway fail, he said.

Here's a rundown of the rest of Version 3.0's enhancements:

- The ability to handle up to 5,000 users and 512 concurrent sessions — double the previous capacity.
- An upgraded version of HostPrint, software that lets end users print host-based information to IntranetWare-based printers. HostPrint 2.0's key new feature is integration with Novell Directory Services, which lets network administrators manage host printing services from the same interface as all other LAN-based printing services.
- Advanced Peer-toPeer Networking Network Node and End Node support and High Performance Routing capabilities. These additions enable faster, more persistent access to data and applications running on mainframes and minicomputers.

IntranetWare for SAA 3.0 sits on either an IntranetWare or NetWare 4.11 server. Like previous versions of the gateway, Version 3.0 has been developed primarily by IBM and will be mainly marketed by Novell.

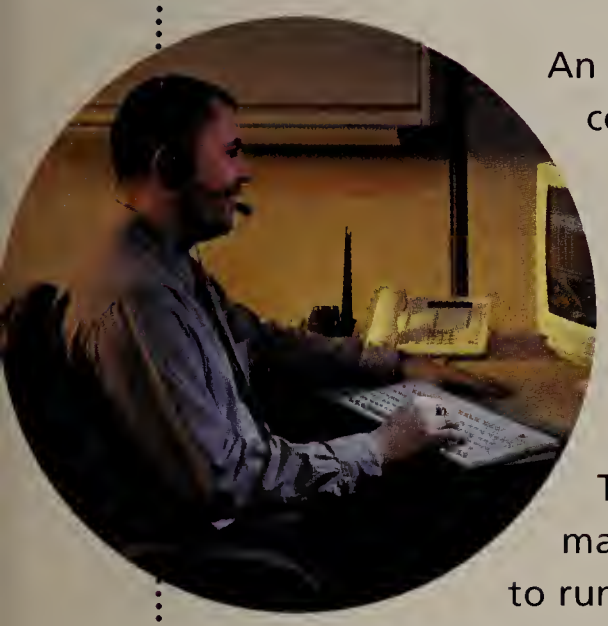
The software will be available at the end of this month. Pricing starts at $2,395 for a 10-user license.

✆ Novell: (800) 453-1267



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Circle Reader Service #11

Nortel routes e-mail into the call center queue

First-generation software aims to improve users' spotty handling of Web shoppers' inquiries.

By David Rohde
Santa Clara, Calif.

New software from Northern Telecom, Inc. promises to organize the notoriously chaotic process of responding to customer e-mail.

Nortel this week will announce the Symposium WebResponse Server, a Windows NT-based system that routes customer e-mail generated by a company's Web site onto the desktops of the company's call center agents. The idea is to get agents to answer e-mail inquiries in a timely fashion.

Until now the market has been dominated by small companies such as Mustang Software, Inc., of Bakersfield, Calif., whose Internet Message Center server sends a quick notice of receipt to the sender, then pops the e-mail onto the desktops of employees assigned to answer the mail (*NW*, Aug. 18, 1997, page 36).

Nortel is expected to sell Symposium WebResponse as an adjunct to its big installed base of automatic call distribution (ACD) systems. The package will let agents already accustomed to answering 800 calls to deal with customer e-mail as well.

"The handling of e-mail is getting to be a key issue for call centers," said Sheila McGee-Smith, director of call center services for The Pelorus Group, a consultancy based in Raritan, N.J. "It's a big opportunity because right now nobody in corporate environments seems to be responsible for it."

Other big ACD vendors also are examining the market. Nortel rival Aspect Telecommunications, Inc. earlier this month announced it will resell a customer e-mail response system from another small company, San Diego-based Aptex Software, Inc.

Nortel's WebResponse software sits on a different server from the corporate Web server. Residing inside a firewall to prevent spam broadcasts from tying up agents' time, the server stores the messages in an Open Database Connectivity-compliant database and places header information, such as a time stamp and general subject matter, onto agents' Windows NT clients or Windows 95 desktops.

Nortel also provides users with a customizable e-mail request template that enables them to state whether they want a telephone or e-mail response. That information is then provided to the agents handling the mail.

If the consumer prefers a telephone call, the agent can select the message and click on a telephone icon to launch the callback via Microsoft Corp.'s Telephony API link, explained Barry Phillips, a product marketing manager for Nortel's Symposium family of call center products (see graphic).

Phillips conceded that the initial version of Symposium WebResponse is not integrated with Nortel's Symposium Call Center ACD. Agents have to log on separately to the inbound 800 and e-mail systems and switch back and forth between applications.

The Symposium WebResponse Server is due in June at a price of $80,000 for a 10-seat system, including maintenance and support.

✆ Nortel: (800) 466-7835

Dealing with customer e-mail

Nortel's Symposium WebResponse Server provides the following view on a call center agent's desktop:



VocalTec tackles IP voice management

By Denise Pappalardo

VocalTec Communications, Ltd. is taking the first steps toward managing voice-over-IP networks.

The company last week announced its VocalTec Gatekeeper server and VocalTec Network Manager 1.0 client, which will simplify management and enhance security on VocalTec Gateway-based IP voice networks.

VocalTec Gatekeeper server acts like a traffic cop controlling who can and cannot access the VocalTec Gateways, said Francois-Eric de Repentigny, industry analyst at Frost & Sullivan Market Intelligence, a Mountain View, Calif.-based consulting firm.

The Windows NT-based Gatekeeper server authenticates and authorizes users trying to access a voice network. Users must be employing devices that conform to the IETF's H.323 Version 2 specification for voice over IP. The H.323 Version 2 standard defines intelligent network service features such as call forwarding and call transfers over an IP network, de Repentigny said.

The server also supports least cost routing (LCR) intelligence, said Ido Ganor, director of product marketing at VocalTec. LCR is calculated by software running on the Gatekeeper, which searches for the most cost-effective way to deliver calls, he said.

VocalTec Network Manager 1.0 is an SNMP-based client that lets users monitor the status and performance of VocalTec Gateways on their networks (see graphic).

The client reports events such as failed links and identifies users on individual lines. Failed lines can be reconfigured directly from the client's console. Users also can integrate the client onto Hewlett-Packard Co.'s OpenView management platform, Ganor said. This enables users to control the IP data and voice networks from a single OpenView console.

Analysts agree that VocalTec is ahead of the gateway vendor pack with its management features.

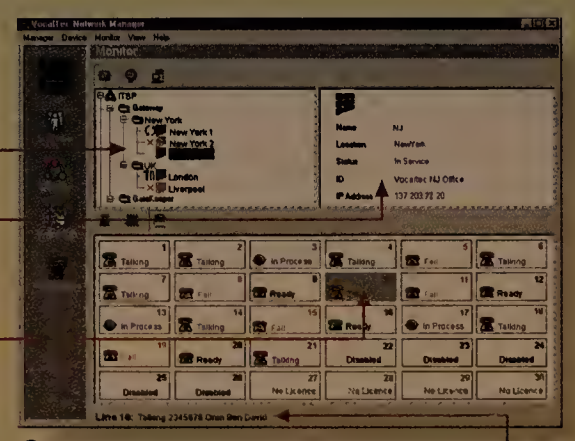
"Most gateway vendors will have to start offering better management and gatekeeper support if they want to survive," de Repentigny said, adding that Ericsson and Lucent Technologies, Inc. also are developing gatekeepers.

The VocalTec Gatekeeper and VocalTec Network Manager are slated for availability by June. Pricing is not yet available.

✆ VocalTec: (201) 768-9400

Viewing your IP voice network

VocalTec Network Manager lets users check the status of network devices from their desktops.



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NetTech

Continued from page 1

to the court for auction. But in an amazing twist of fate, Gregory this month bought EView back from the auction block and will soon resume selling it via his new firm, Bantam Labs, Inc.

Life wasn't always this crazy for Gregory. In 1990, the ex-IBM employee took $200,000 and formed NetTech. Two years later, Cabletron gave him a network management research contract — the result was EView software.

EView, which runs Unix and AIX, lets users monitor the performance of multivendor networks and helps them handle troubleshooting, capacity planning and service-level tracking. Cabletron made EView part of its Spectrum management package.

In 1993, Gregory appointed another ex-IBMer, Michael Carney, as president of NetTech, primarily to develop new business. That he did. One of his first orders of business was to call up an old friend at Cisco — then marketing director Nick Francis. That call led to an approximately $500,000 contract to develop software for Cisco's CiscoBlue management package.

"Everything is timing and relationships," said Francis, who is now president of Madison Group consultancy in Cary, N.C.

The company kept up its good timing in 1995, when HP certified NetTech as one of its premier OpenView partners. This meant NetTech had the blessing of one of the largest network management platform vendors in the world.

NetTech also had attracted the attention of a new local venture capital firm, the Southeast Interactive Technology Fund, which infused $500,000 into NetTech; other investors brought in an additional $475,000 and a board was set up to watch over it all. The sky seemed the limit.

But things started slipping internally in 1995. First, Gregory demoted Carney to chief financial officer and made himself president. Carney, despite a $100,000 personal investment in NetTech, decided to leave.

Carney's departure did not bode well for the Cisco relationship.

"There is a tremendous danger when an engineer is running the company," Francis said. "Ellis never did know what he didn't know, and his ego never let him know it."



EDWIN MORGAN

"I was captain of the ship ... I issued oars when the diesel engine wasn't working, and some employees took the oars and hit me in the head, and some helped steer."

Ellis Gregory, former president and CEO of NetTech, now president of Bantam Labs

The outside possibility of a buyout from Cisco also vanished. "At that time, Cisco considered equity positions in companies — especially management companies. But with the change of management [at NetTech], all that went out the door," Francis said.

Then, in 1996, one of Gregory's friends and an early NetTech partner died of leukemia. To investors, the original management team seemed to be falling apart.

"When we first invested, there was more of a management team than ended up being there," said David Blivin, managing director at Southeast. "Usually you build up a management team, not take one apart."

Gregory ran the company for the next year. During that time, NetTech won a $2.5 million contract from LSI Logic, a chip manufacturer in Milpitas, Calif. The company also brought on a new chief technology officer, David Keith, from LSI.

At that point the lack of a clear-cut marketing program hurt EView sales, Gregory said. And when NetTech had a drop-off in revenue, it turned to its 35 employees for help, paying them in stock options and even borrowing from them. Keith cosigned a $25,000 loan so NetTech could buy an AS/400.

"It was nuts on my part to give [Gregory] money," said Keith, who is still paying back that loan.

In 1996, Gregory hired NetTech board member Joe Drimer as company president. Keith and Drimer didn't get along so Keith left in November.

Accusations began to surface about Gregory's management style: Drimer claimed Gregory intimidated the employees. Drimer also wanted to port EView onto the Windows NT platform but Gregory didn't think NetTech was prepared for that.

Things got so bad between Gregory and Drimer that the company paid a psychologist a reported $10,000 to evaluate the situation and decide if the two men could work together.

For fiscal year 1997, Drimer projected the company would make $5.8 million in revenue: NetTech came in at $2.6 million. In March, Drimer was fired.

Soon after, NetTech's board voted Gregory out as president and replaced him with Andre Boisvert, a general partner in Southeast and former vice president of worldwide marketing at Oracle Corp.

The NetTech board, with Boisvert as CEO, filed for bankruptcy and closed its doors in September 1997. A number of employees found themselves liable for bills run up on company credit cards — one person owed $16,700. The bankruptcy filing quickly went from a Chapter 11 reorganization to Chapter 7 liquidation of assets.

Last month, the only bid for the rights to EView came from Gregory — who offered $190,000 raised from friends and family. Still, Gregory, who wants to repay all of NetTech's employees, is optimistic.

Gregory said he hopes to re-establish some of the old partnerships, reach out to NetTech's installed base of about 16 customers, and get some third parties to resell EView. He also plans to port EView to the Windows NT platform. We'll be back," Gregory said. ■

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NetTech's odd turn of events

1990
- Ex-IBMer Ellis Gregory founds the company.

1991
- Company earns almost $600,000 in consulting fees.

1992
- Cabletron awards NetTech research contract.
- EView management software introduced.

1994
- Cisco signs a software development deal.

1995
- HP names NetTech an OpenView partner and offers to resell EView.
- Venture capital firm Southeast Interactive Technology Fund invests $500,000 in NetTech and helps the company raise another $475,000.

1997
- Board votes Gregory out as CEO.
- In September, NetTech files for bankruptcy owing $1.38 million; liquidation begins.

1998
- In bankruptcy auction, Gregory buys EView software back for a mere $190,000.

IBM

Continued from page 1

The software enhancements are part of IBM's ongoing effort to make mainframes intranet- and Internet-friendly, with new impetus coming from customer interest in Web-based commerce.

OS/390 integrates more than 30 software products that were previously sold separately, including MVS and communications programs such as VTAM and TCP/IP for MVS. OS/390 also includes the mainframe's Unix-based operating system, OpenEdition/MVS, and object-oriented database tools.

The key in the announcement will be improved IP performance. In this release, IBM has rewritten the TCP/IP for MVS stack to run more efficiently. IBM has promised three- to six-fold improvements with each rewritten stack in the past. Because upward of 50% of IBM mainframes will be running TCP/IP by year-end, it is imperative that it performs well, analysts said.

Also in the performance realm, OS/390 2.5 will let Unix applications run faster on the mainframe by more closely tying the IP stack and OpenEdition. Today, users must traverse MVS, OpenEdition and the TCP/IP stack to access Unix applications on the mainframe.

Reportedly, Version 2.5 will eliminate the need to go through MVS, thereby improving application performance, sources said.

IBM has about 1,200 developers committed to building Unix applications for the mainframe.

The new OS/390 release will also improve availability of IP-based parallel sysplex mainframes. Parallel sysplex straps together multiple mainframes in a cluster.

Sources said IBM is planning to support failover in IP-based parallel sysplex environments, so that if one machine in a cluster crashes, another can pick up its duties.

The OS/390 fail-over safeguards data transfers, said David Floyer, an analyst with International Data Corp., a Framingham, Mass.-based research company. Previously, the only failover possible was from processor to processor within a single machine, he said.

The next biggest improvement to the OS/390 package is the integration and enhancements of its Internet security package.

The company is bundling a firewall, digital certificates and its Cryptographic Coprocessor inside OS/390. In the past, users had to buy these packages separately.

IBM also is enhancing the OS/390 Secure Server IBM with Data Encryption Standard (DES) Version 3, a high-end authentication and encryption product.

The advantage of OS/390 2.5 is that the security features reside on one box. Users don't need to attach any special Web servers or other devices to the S/390 mainframe, Floyer said. "All the components for authentication and security are on the server," he said.

One user believes this one-stop-shopping style of security could save him a lot of trouble.

Robin Mauldin, director of the data center for Ikon Office Solutions, based in Macon, Ga., said he recently sent a piece of data from his S/390 out over the World Wide Web and had to go through a lot of hoops in securing it. The data had to be sent to a local LAN, encrypted and then finally sent.

OS/390 2.5 should be available next month. ■

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Bomb

Continued from page 1

at the META Group, Inc. consultancy, in Reston, Va.

Computer sabotage events rarely are reported publicly as most companies seek to hide any network or computer-related vulnerablities.

Lloyd, a resident of Wilmington, Del., last week pleaded innocent in Federal District Court in Newark, N.J., to two counts: intentionally causing damage to Omega's network and stealing $50,000 worth of computer equipment. Lloyd could not be reached for comment.

According to Al DiFrancesco, Omega's director of human resources, the Omega staff simply walked into work one day and found all the files on the NetWare servers in the firm's Bridgeport, Conn., office had been deleted.



"We didn't suspect sabotage at first," DiFrancesco said. "It wasn't clear to us at all what had happened."

The company immediately called in a computer consultant, whom Omega does not want to name until the trial begins, to help identify the problem.

According to DiFrancesco, the consultant knew enough about computer forensics to collect evidence of the logic bomb in a program file that ultimately pointed to Lloyd.

Omega Engineering, which routinely backed up each of its LAN servers, also discovered that the backup drives were missing.

The company called in the U.S. Department of Justice. The Secret Service then raided Lloyd's house and found some of the missing computer equipment, according to DiFrancesco.

The human resources director offered no further details about the event, and the sabotage case against Lloyd remains to be proven in court.

But if a logic bomb was indeed the source of the massive file eradication, what advice would Omega Engineering give other companies to protect themselves against a network administrator gone bad?

"Make sure you employ state-of-the-art techniques and back up your tapes off-site," DiFrancesco suggested.

Byrnes said these computer bombs are far easier to plant on LANs rather than mainframes because protected access to programs on mainframes usually is more stringent.

The main point is that it is almost impossible for anyone who isn't the network administrator to lob a logic bomb into the network, Byrnes said.

Someone who doesn't have "administrator" powers in the Novell world, or "root" control in Unix, for instance, can't do it. If you're not the systems administrator, "you will have to hack your way in" to commit sabotage with logic bombs, Byrnes said.

The type of network protection equipment sold by Internet Security Systems, Inc. and Netect, Inc. will not save you from logic bombs, Byrnes pointed out.

In fact, there is no security software on the market that can spot a planted logic bomb. However, antivirus software vendor Safe Technologies, Inc. is working on software that can actively intercept malicious code — flinging itself in front of the operating system — when it detects unauthorized actions, Byrnes said.

Technically, a logic bomb is not a virus since it doesn't replicate, but it could be carried by a virus.

Smaller companies often rely on one person to handle network administration, but the risk of sabotage can be somewhat diluted if at least two or more are assigned collaborative tasks, said Adam Shostack, director of technology at Netect. ■

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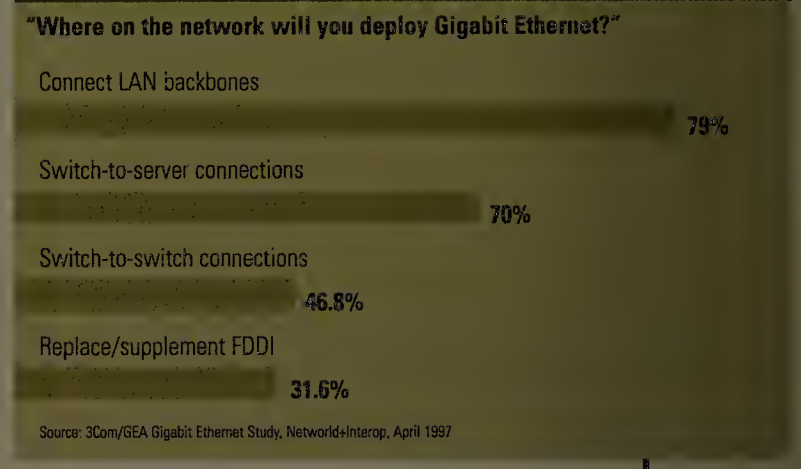
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Is Gigabit Ethernet really just a higher-powered version of the standard Ethernet you've worked with for years? Certainly, Gigabit Ethernet will be the most familiar high-speed technology, and that's one of its major appeals. The promise of low training costs and investment protection for the 100 million nodes of installed Ethernet products should capture the attention of even the most skeptical network manager. The ability to scale from 10 to 100 to 1000 Mbps will be a powerful driver for widespread deployment (see Figure 1).

Fig. 1 The most popular deployment for Gigabit Ethernet will be in LAN backbones



And what about standards? As with other technologies, buyers want to be sure that new Gigabit Ethernet products comply with technology standards. The IEEE has made significant progress on ratifying key portions of the Gigabit Ethernet specifications, and enough of the standard is already in place to support product design.

While Gigabit Ethernet is a promising high-speed technology, the question remains: Is it the right strategic choice for your network? There are challenges for deploying Gigabit Ethernet. A thorough end-to-end assessment is required rather than just inserting "point products" at specific network bottlenecks. First, we need to examine where, when and why increased bandwidth must be deployed. Each area of potential bottleneck needs to be examined: desktop, server, data center aggregation points and backbones. Gigabit Ethernet, or even Ethernet in general, may or may not be the best solution. For example, ATM, for many, may be the preferred backbone choice. ATM is certainly a popular solution today. While the two technologies will be tough competitors in backbone networks, they can be complementary. We'll describe how Gigabit Ethernet and ATM can be deployed strategically in different portions of the network for optimal results.

Second, exclusively throwing bandwidth at problems, even Gigabit bandwidth, will serve only as a "bandwidth band-aid." Some level of bandwidth control has always been required, and the need is becoming even more intense because of emerging multimedia and mission-critical applications. Hence, we need to examine where "network control" fits into the high-speed puzzle. Is it possible to have both bandwidth and brains? Between class of service and quality of service, RSVP, 802.1Q/p, VLANs, cut-through routing, routing and Layer 3 switching, it's no wonder network managers are confused about the best method for optimizing control over a seemingly chaotic environment. We'll address how to provide Ethernet-based policies and service levels in your network, and how to scale performance, while ensuring your network traffic receives the priority it needs.

There's hope yet for bandwidth depleted networks—and for weary network managers looking to keep their networks out of intensive care. Gigabit Ethernet, in strategic combination with ATM and network intelligence, can be the prescription for a thriving network—with the promise of a long, healthy life.▪



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The Next Step in the Ethernet Evolution

Karl Pieper and Rob Fowler

Local area networks are dominated by Ethernet. The demands of today's users will present many integration and migration challenges to network managers:

- Delivering new applications which require an increase in available bandwidth.
- Protecting existing investments in hardware, software and personnel.
- Ensuring a low cost of ownership for future network developments.

Meeting these demands will be an evolutionary process, the beginning of which is the widespread installation of Ethernet switches and 10/100 Network Interface Cards (NICs). Most Ethernet switches installed today have been deployed as segmentation devices. They have delivered major improvements in performance, compared with the shared media environment that preceded them. As impressive as these major improvements may seem, however, emerging network applications dictate that further improvements to available bandwidth will need to be made before long.

Integrating 10/100/1000 Mbps

Driving the demand for Gigabit Ethernet is the increased bandwidth being deployed at the edge of the network with desktop devices. In Figure 1, we see how the evolution of desktop connectivity is occurring in several directions. Driving this evolution are the shrinking cost deltas between shared and switched technologies, along with user application demands.

Shared/switched Ethernet has been meeting the needs of the typical office user for quite some time. But as new applications evolve, dedicated 10- and even 100- Mbps links to the desktop will become increasingly necessary. Whichever solution is implemented, increasing the bandwidth available to the desktop transfers the bottleneck upstream, leading to greater bandwidth requirements for servers and inter-switch connections.

The technology used to deliver these connections must fit the same purchasing criteria as the devices at the edge of the network. In terms of investment protection, the technology must be delivered at a price point that reflects the rate at which it will become commoditized. Gigabit Ethernet meets all these requirements.

Gigabit Ethernet offers:

- A 10-fold increase in raw performance over today's most popular server and inter-switch connection, Fast Ethernet.
- A familiar technology, so existing investments in the network and personnel are protected.
- Value for the money; the corresponding increase in price is threefold, and with the ramp in Gigabit Ethernet deployment, users can expect to see a decreasing cost curve similar to those seen in other technologies.
- No new overlay protocols to learn, a small learning curve, low risk, common end-to-end framing.

Moving up in the "Gigabit" World

Simply put, Gigabit Ethernet is like Fast Ethernet, only an order of magnitude faster. Designed for high performance and scalability, it provides dramatic increases in the bandwidth available for users to access applications.

Upgrading FDDI-based Networks with Gigabit Ethernet

FDDI is still one of the dominant high-speed technologies in many campus/building infrastructures, its inherent fault tolerant capabilities and dependable performance characteristics ensured that it played a key role in both backbone and mission critical, network-centric applications.

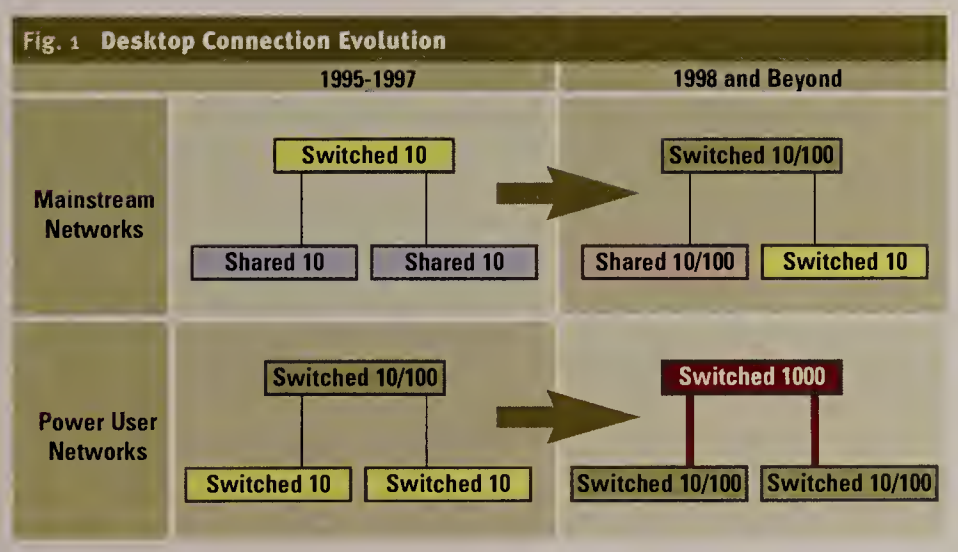
Many companies are now at a critical juncture where they need to decide what technology they will invest in for the future. Will they continue to pay a premium for FDDI, perhaps migrating to Switched FDDI, or decide to cease continued investment and start the migration toward another technology?

Most FDDI campus networks have the majority of stations connected on shared/segment switched Ethernet, so it makes sense to leverage the investment toward Fast Ethernet with Gigabit Ethernet. Migration is always a gradual controlled process balancing risk, investment and stability. Coexistence of FDDI with 10/100/1000-Mbps Ethernet (all speeds) is vital to achieve this end goal.

Suggested Migration Plan

- **1.** Upgrade existing shared FDDI backbone to switched Fast Ethernet. Purchase appropriate interfaces for edge switches and implement FDDI/Ethernet switch alongside FDDI concentrator in network center.
- **2.** FDDI shared ring in network center is now switched to the Fast Ethernet backbone.
- **3.** If investment in host/router interfaces is significant, segment the ring into separate collision domains. Migrate the Fast Ethernet backbone to Gigabit Ethernet.
- **4.** When investment in FDDI host/router interfaces are fully depreciated, migrate to switched Fast/Gigabit and complete the implementation to fully switched 10/100/1000-Mbps Ethernet solutions.■

Fig. 1 Desktop Connection Evolution



Gigabit backbone networks can support many more segments and nodes without degrading performance. The initial deployments aggregate edge switches in the backbone, providing ultra-high-speed paths to centrally located resources. From there, the Gigabit technology can be extended to connect high-end host computers/servers to the infrastructure, solving current Fast Ethernet adapter bottlenecks.

By anchoring network cores to Gigabit Ethernet switches, administrators can migrate switched or shared 100Base-T systems to network boundaries and distribute higher bandwidth without congesting the backbones. Just as there is no single way 10- and 100- Mbps Ethernet has been deployed, there are a number of migration paths to Gigabit Ethernet. Figures 2 and 3 illustrate two possible paths, depending on the network's existing infrastructure.

For an existing LAN infrastructure it will be critical for a network manager to partner with a vendor whose installed base products enable the migration to Gigabit Ethernet. Forward compatibility is critical and entails offering Gigabit Ethernet uplinks for existing stackables and chassis. The installed desktops, comprising shared and switched 10/100 Mbps, must be able to connect to the new high-speed backbone. For example, 3Com's installed based of 6 million SuperStack II switch ports can migrate forward through installation of a Gigabit Ethernet downlink module. As well, a portion of the installed base of FDDI backbones (which remains the number one high-speed backbone technology in the world), will require a migration path to Gigabit Ethernet (or even ATM). The solutions which can provide the easiest migration path will be the ones that ultimately succeed.

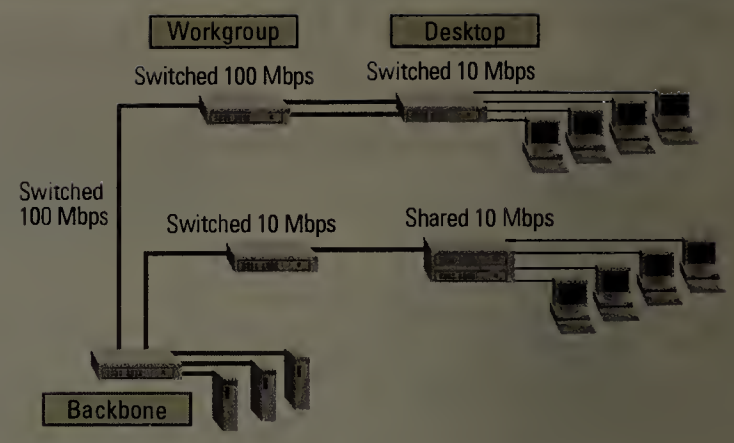
Conclusion

Gigabit Ethernet is a natural extension of 10/100 Ethernet networking. It brings not only increased bandwidth but also new features that enable it to function as an "intelligent" network, while keeping cost for support and implementation low. Better yet, Gigabit Ethernet products are projected to be more cost effective than any other technology solution. As IDC states: "The basics—pricing, packaging, legacy integration and support—dictate future success."▪

Fig. 2 10/100/1000 Migration

Before

- A backbone switch provides dedicated 100 Mbps links to local servers and workgroup switches.
- Workgroup switches connect desktop switches and/or hubs with 10 or 100 Mbps performance.
- Users have shared or switched 10 Mbps.



After

A Gigabit Ethernet backbone is implemented as the aggregation device, providing one gigabit of bandwidth to local servers, workgroup switches and desktop switch/hubs, allowing increased bandwidth to the desktop.

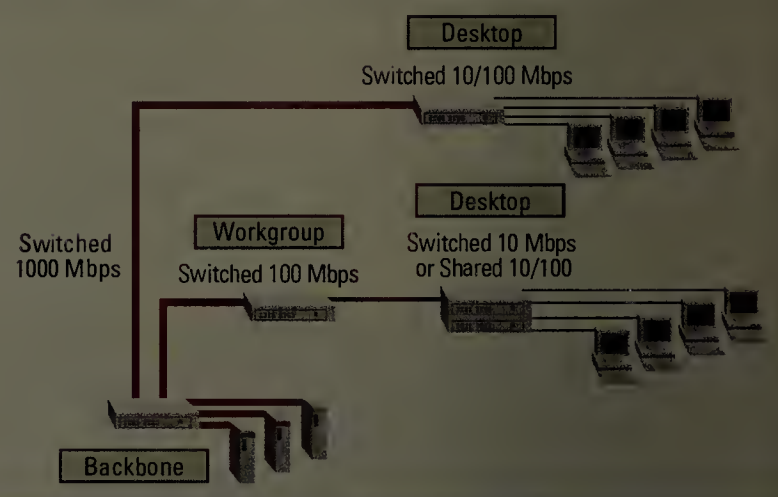
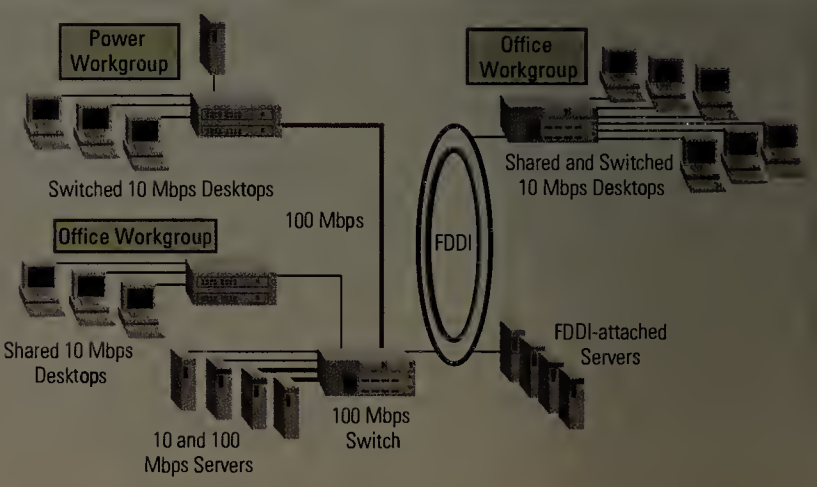


Fig. 3 FDDI Migration

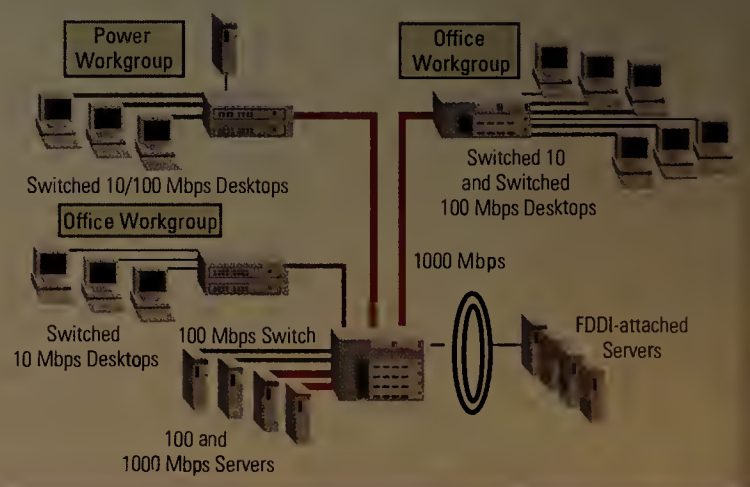
Before

- Current business applications increase bandwidth demand so general office users are faced with slow response time.
- Power users are bottlenecked by 10 Mbps links.
- The extra bandwidth required to the desktop increases the load on the FDDI backbone.
- New desktops come with standard 10/100 PCI cards installed.



After

The Gigabit Ethernet backbone services high density switched 100 Mbps users and switched 10 Mbps workgroups, alleviating backbone contention, and provides direct connections to key servers. The coexistence of FDDI and Gigabit Ethernet preserves investment in existing switches and servers.



Standards Emerging for Gigabit Ethernet

Bruce Tolley

Table 1 Gigabit Ethernet—Meeting Tomorrow's Needs

	Ethernet	Fast Ethernet	Gigabit Ethernet Design Goals
Data Rate	10 Mbps	100 Mbps	1000 Mbps
Cat 5 UTP	100 m (min)	100 m	100 m
Shielded Copper	500 m	100 m	25 m
Multimode Fiber	2 km	412 m (half duplex)	260–550 m
		2 km (full duplex)	
Single Mode Fiber	25 km	20 km	3 km

Source: 3Com

Table 2 Transceivers and Media

Transceiver	Media
1000Base-SX	62.5-µm Multimode Fiber
	50-µm Multimode Fiber
1000Base-LX	62.5-µm Multimode Fiber
	50-µm Multimode Fiber
	Single-Mode Fiber
1000Base-CX	Twinax or Quad
1000Base-T	Category 5 UTP

Source: IEEE 802.3z and 802.3ab Goals

There are two important points to remember about the emerging Gigabit Ethernet standards. First, Gigabit Ethernet is Ethernet, only faster. The network planning and implementation issues when upgrading to Gigabit Ethernet will be similar to those encountered when upgrading from Ethernet to Fast Ethernet.

Second, this technology is real and it is here today. Network managers in need of high-speed alternatives should be evaluating Gigabit Ethernet products now. The bottom line: Gigabit Ethernet provides a straightforward, incremental migration to higher-speed networking.

The Same Ethernet, Enhanced

Gigabit Ethernet is Ethernet, only faster. All three Ethernet speeds—10, 100 and 1000 Mbps—use the same IEEE 802.3 frame format, full-duplex operations and flow-control methods. To point out the obvious, when connecting Gigabit Ethernet to Ethernet or Fast Ethernet, there is no need to translate frame formats, which decreases complexity and improves overall switching performance. All initial implementations of Gigabit Ethernet will be full-duplex, switched connections and will use the regular Ethernet 96-bit interframe gap (IFG) and 64-byte minimum packet size. In half-duplex mode, except for some minor changes, Gigabit Ethernet employs the same fundamental CSMA/CD access method.*

*The Gigabit Ethernet CSMA/CD method was changed slightly in order to maintain a 200-meter collision diameter at gigabit per second data rates. Without this enhancement, small Ethernet packets could complete transmission before the transmitting station sensed a collision, thereby violating the CSMA/CD rule. The minimum packet length of 64 bytes has not been changed. The minimum CSMA/CD carrier time and the Ethernet slot time have been extended from 64 bytes to 512 bytes. Packets smaller that 512 bytes have an extra carrier extension added to them. These changes, which can impact the performance of small packets, have been offset by implementing a feature called packet bursting which allows servers, switches and other devices to deliver bursts of small packets in order to utilize the available bandwidth.

Choices at the Physical Layer

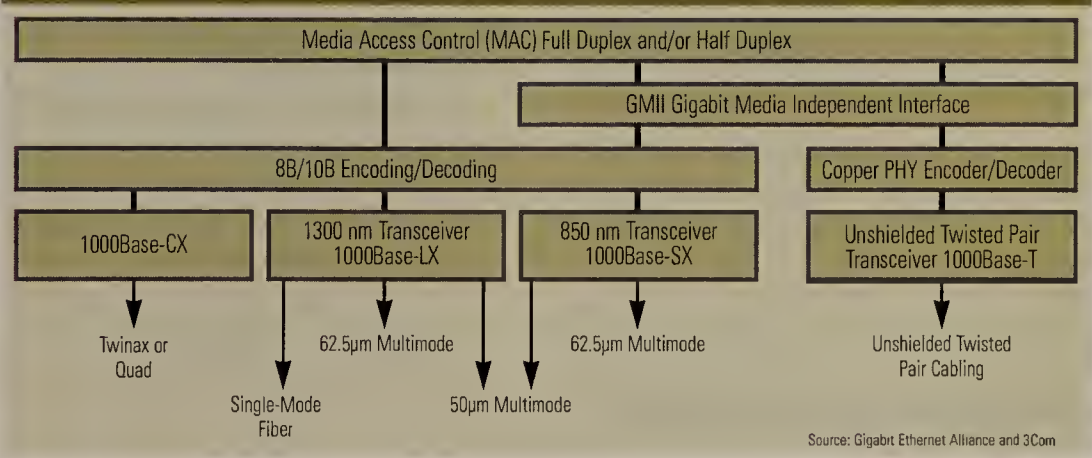
The table above compares the distance goals of the various Gigabit Ethernet transceivers, or PHYs, with those of Ethernet and Fast Ethernet. Because Gigabit Ethernet is being developed to support switch-to-switch and switch-to-server connections in building and campus backbones, the standards effort has devoted attention to developing specifications for fiber optic transceivers, optics and distance goals over multimode and single-mode fiber.

To accelerate standards development, the 802.3z Task Force borrowed and modified the physical layer signaling protocol used by the ANSI Fibre Channel standard. This standard offers proven physical layer technology that operates at gigabit-per-second rates, and provides access to readily available, cost-effective, fiber-optic components from many different suppliers. The Fibre Channel PHY signaling technology has the added benefit of supporting short, 25-meter connections over balanced, shielded copper cable (twinax or quad), used mainly in wiring closets for short jumper connections. IBM Type 1 cable (ISO/IEC 11801:1995), also known as STP, is not recommended for 1000Base-CX.

To accelerate the standards process and to keep intense focus on the optical PHYs, the 802.3z Task Force established a separate, dedicated 802.3ab Task Force to address the copper UTP issues, called 1000Base-T. In addition, there was no established, standard copper physical layer technology that could handle gigabit-per-second rates for distances of 100 meters over Category 5 cable. The 802.3ab Task Force is planning aggressively and a solid draft specification is expected by the end of 1998.

Figure 1 shows the four PHYs: 1000Base-SX, the short wavelength fiber optic transceiver; 1000Base-LX, the long wavelength fiber optic transceiver; 1000Base-CX for short-haul copper; and 1000Base-T for Category 5 UTP. Most of the adapter, hub and switch products on the market use the 1000Base-SX transceiver.

Fig. 1 Gigabit Ethernet Layers



Source: Gigabit Ethernet Alliance and 3Com

It is important to keep in mind that 802.3z Gigabit Ethernet, like all other types of Ethernet, is a media access layer and physical layer technology. In actual implementations, Gigabit Ethernet will work with other IEEE and IETF specifications such as 802.3x for flow control, 802.1Q for VLANs, 802.1p for prioritization of traffic and RSVP for bandwidth reservation.

Server Bottlenecks

Scaling the typical PC server to Gigabit speeds requires looking at more than the size of the network pipe. Network and computer systems companies are both working to improve the overall performance to Gigabit levels.

Bus Speeds Accelerating

The 32-bit PCI bus implemented in today's servers typically has a theoretical bandwidth below what Gigabit Ethernet can potentially deliver. Server vendors are moving from 32-bit PCI to 64-bit PCI. That change, when combined with bus speed improvements, will significantly increase the available server bandwidth well beyond Gigabit Ethernet capacity. This will ensure that PCI won't be a bottleneck until the next generation of LAN technology.

3Com Making NICs More Intelligent

But more than the bus, it turns out that what limits throughput even more is the memory bandwidth and the host CPU itself. Even most of today's high-end systems can push only 300 to 400 Mbps through its network interface cards. Therefore, CPU utilization rates need to be optimized to maximize network throughput. 3Com has added intelligence with an on-board processor on the Gigabit NIC, to off-load a variety of fundamental CPU functions, including TCP/IP checksum calculations, byte swapping and aligning the user's data on page boundaries in a cooperative effort between the intelligent hardware and software. The NIC can make intelligent choices about when to interrupt the host CPU, thereby reducing the total number of interrupts required. For example, under heavy loads, the server NIC can simply store multiple packets before interrupting the CPU. Another way that performance is enhanced is through improvements to protocol stacks and network operating system interfaces. This will also allow the server to take full advantage of Gigabit Ethernet bandwidth in the near future.▪

Because it follows the same form, fit and function as its 10- and 100-Mbps predecessors, Gigabit Ethernet can be seamlessly integrated into existing Ethernet and Fast Ethernet networks using LAN switches or routers to adapt between the different physical line speeds. Because Gigabit Ethernet is Ethernet, only faster, network managers will find the migration from Fast Ethernet to Gigabit Ethernet to be as smooth as the migration from Ethernet to Fast Ethernet.

Standards Status and Deployment Schedule

This technology is real and it is here today. Since its formation, the 802.3z Gigabit Ethernet Task Force writing the specifications has had great success in meeting its milestones. The standards work is on track for formal ratification in mid-1998. Gigabit Ethernet has gained wide industry support, with over 100 companies joining the Gigabit Ethernet Alliance (GEA), an industry consortium founded to promote the standard, facilitate interoperability testing and educate the end user community.

The process to complete the Gigabit Ethernet standard has moved more quickly than for comparable high-speed networking alternatives. In January 1997, the IEEE 802.3z Gigabit Ethernet Task Force closed the specification to new features and settled on a stable first draft. Between January and May of 1997, on the basis of these stable specifications, leading vendors like 3Com were able to develop Gigabit Ethernet products. They also were able to build a multivendor Gigabit Ethernet LAN with more than 20 other vendors at the GEA's technology demonstration during the May 1997 Networld+Interop show in Las Vegas. An even greater number of vendors demonstrated the interoperability of their respective Gigabit Ethernet products at the October 1997 Networld+Interop show in Atlanta.

The IEEE 802.3z specifications are expected to be formally ratified in mid-1998. The specifications are stable and no new features will be added. Thus, customers can be confident not only that products purchased before final ratification will interoperate with Gigabit Ethernet products from other vendors, but also that these products will interoperate with Gigabit Ethernet products that ship after the standard is approved.▪

The Lowdown on High Speed: Gigabit Ethernet and ATM

Bruce Tolley

Some industry pundits and proponents of Gigabit Ethernet claim that Asynchronous Transfer Mode (ATM) has lost its steam and momentum, while Gigabit Ethernet has taken high-speed networking's center stage. But, in fact, the two technologies complement rather than compete with one another and network managers should be looking to leverage the advantages of each.

The attraction of Gigabit Ethernet rests largely on two key characteristics. First, Gigabit Ethernet preserves Ethernet's simplicity while enabling a smooth migration to gigabit-per-second (Gbps) speeds. Second, it delivers very high bandwidth to aggregate multiple Fast Ethernet segments and to support high-speed server connections, switched intra-building backbones, interswitch links and high-speed workgroup networks.

Meanwhile, ATM campus backbone installations continue to grow, fueled by ATM's scalability and resiliency. According to the Dell'Oro Group, since 1995 the ATM LAN market in annual shipments has grown over sevenfold, from 76,300 ports to 486,000 in 1997.

Clearly, ATM complements and will coexist with Gigabit Ethernet. Using ATM is an ideal way to meet robust requirements, such as scalable campus backbones, inter-building backbone links, load sharing, multiservice aggregation and connections to wide area network (WAN) services.

It cannot be overemphasized that ATM inherently provides robustness and resiliency because of its ability to support load sharing, flexible topologies and rerouting around failed links and switches.

New Bandwidth Demands

Both the recent development of Gigabit Ethernet and deployment of ATM reflect the growth in applications that require much more bandwidth than is found in most networks today (see Table 1). These applications can be organized into the following categories:

- Scientific modeling, publication and medical imaging, as file sizes grow from megabytes to gigabytes and terabytes.
- Internet and intranet applications, including multimedia to corporate and home desktops.
- Data warehousing and backup, where files are ballooning in size.
- Bandwidth-intensive groupware applications, such as desktop videoconferencing, interactive whiteboarding and real-time video streaming, which promise to become increasingly popular productivity and training tools.

While these applications require more raw bandwidth, building networks that support these applications also poses network design and management issues. For example, multimedia applications such as high-quality, interactive videoconferencing and whiteboarding demand low latency and limited jitter to be effective. And Internet/intranet applications create unpredictable traffic patterns that break the old 80/20 rule—80 percent of LAN traffic was expected to remain local. With HTML traffic and access to websites inside and outside the corporate network, there is no way to predict where traffic will go.

Different Design Goals

Gigabit Ethernet and ATM have emerged to meet these challenges, but when comparing the two, it is vital to keep their different design goals in mind.

Gigabit Ethernet builds on the familiar 10/100-Mbps Ethernet technologies to offer 1 Gbps of bandwidth. Ethernet was designed to transport data traffic over packet-based networks, and Gigabit Ethernet is the next logical step in its evolution. As mentioned above, Gigabit Ethernet preserves Ethernet's simplicity, leverages its cost drivers and takes advantage of the installed base of Ethernet devices. Moreover, it takes advantage of the familiarity, knowledge and expertise possessed by network managers with both Ethernet and IP-based traffic and services.

Table 1 New Bandwidth Drivers

	Data Types/Sizes	Traffic Implication	Network Requirement
Scientific Modeling, Publications, Medical	Data files MB to GB	Increased bandwidth needed for large files	Higher bandwidth for desktops, servers, backbone
Internet/Intranet	Data files now Audio now Video future Hi transaction rate Large files	Increased bandwidth needed for large files Low latency Cos/QoS Many data streams	Higher bandwidth for desktops, servers, backbone Low latency
Data Warehousing, Backup	Data files GB to TB	Increased bandwidth needed for large files Search and access require low latency Backup performed during fixed period	Higher bandwidth for servers and backbone Low latency
DVC, Interactive Whiteboard	Constant data stream Up to 3+ Mbps to the desktop	Cos/QoS Many data streams	Higher bandwidth for servers and backbone Low latency Predictable latency

Source GEA

On the other hand, ATM, which was originally developed by the telephony industry, is being deployed for campus network and wide area network (WAN) applications. It offers speeds ranging from 1.5 megabits per second (Mbps) through 622 Mbps, and soon 2.4 Gbps will be available. In contrast to private enterprise LANs, but like public telephony networks, ATM was intrinsically designed for large, scalable, resilient network backbones. One of ATM's key objectives is to integrate telephony, data, voice and video traffic onto one consolidated network for LANs and WANs. ATM currently offers explicit Quality of Service (QoS) from the transmitting end station to the receiving end station over dedicated virtual circuits, and the ability to deliver defined latencies, jitter limits and committed bit rates. This is something packet-based networks were never designed to do.

Gigabit Ethernet: Extending the Dominant LAN Technology

Ethernet is the dominant LAN connectivity technology. At the end of 1996, according to IDC, 83 percent of all networked desktops worldwide were Ethernet. Like Ethernet, Gigabit Ethernet is a Media Access Control (MAC) and Physical (PHY) Layer technology. It specifies the data link (Layer 2) of the OSI protocol model; while upper layer protocols like TCP and IP specify the transport (Layer 4) and network (Layer 3) portions, enabling reliable communication services between applications (see Table 2).

Table 2 Ethernet and Other Services

OSI Layer	OSI Name	Example
4	Transport	TCP
3	Network	IP, RSVP
2	Data Link	Ethernet MAC, 802.1p, 802.1Q
1	Physical	10Base-T, 1000Base-SX

Source GEA

Gigabit Ethernet flow control is implemented with a modified Xon/Xoff protocol, specified by the IEEE 802.3x standard. This mechanism addresses flow control only at the single port level. The wider implications of flow control are handled by upper-level protocols.

The network topology for Gigabit Ethernet follows the traditional rules of Ethernet. At Layer 2, the spanning tree protocol is used to ensure that there are no logical loops in the network, creating a hierarchical tree topology. More complex LAN configurations, including parallel data paths, are created through the use of routing technology, just as in the wide area network.

Ethernet at any speed is designed for transporting data in the local area environment. As originally specified, Gigabit Ethernet does not support real-time voice and video traffic, it cannot prioritize traffic to deliver Class of Service (CoS) and it cannot deliver specific bit rates or limit jitter to deliver Quality of Service (QoS). Instead, it will provide these higher-level services by leveraging other technologies and standards, such as IEEE 802.1p, 802.1Q and the Resource ReSerVation Protocol (RSVP). So although Gigabit Ethernet is optimized for high-speed data, it also provides priority queues to support voice and video over IP in both non-real-time and real-time applications.

ATM: Multiservice and LAN/WAN Integration

ATM is designed to handle any type of traffic. It accommodates a variety of bit rates and supports the bursty communications behavior exhibited by voice, data and video traffic. ATM's ability to control jitter and limit latency across the network enables it to support real-time traffic. End stations can request a specific QoS level from the network, and ATM can deliver that service across a campus or wide area.

Additionally, ATM implements end-to-end congestion and flow control using special indicators that can tell a transmitting end station to slow transmission because the path to its destination is congested. Indeed, the ability today to deliver QoS and support real-time, interactive traffic is one of ATM's greatest strengths.

ATM switching is based on fixed-length packets known as cells. Each ATM cell consists of a 48-byte payload and a 5-byte header. These fixed-length cells allow cell relay switches to process cells in parallel

Gigabit Ethernet and ATM—Which Goes Where?

Deploy Gigabit Ethernet where:

- Simplicity and cost are foremost concerns
- Seamless connectivity from the "desktop out" is critical
- Network traffic is primarily data (or packetized voice/video)
- Delay sensitive multimedia applications can operate with less stringent QoS levels of packet-based LANs

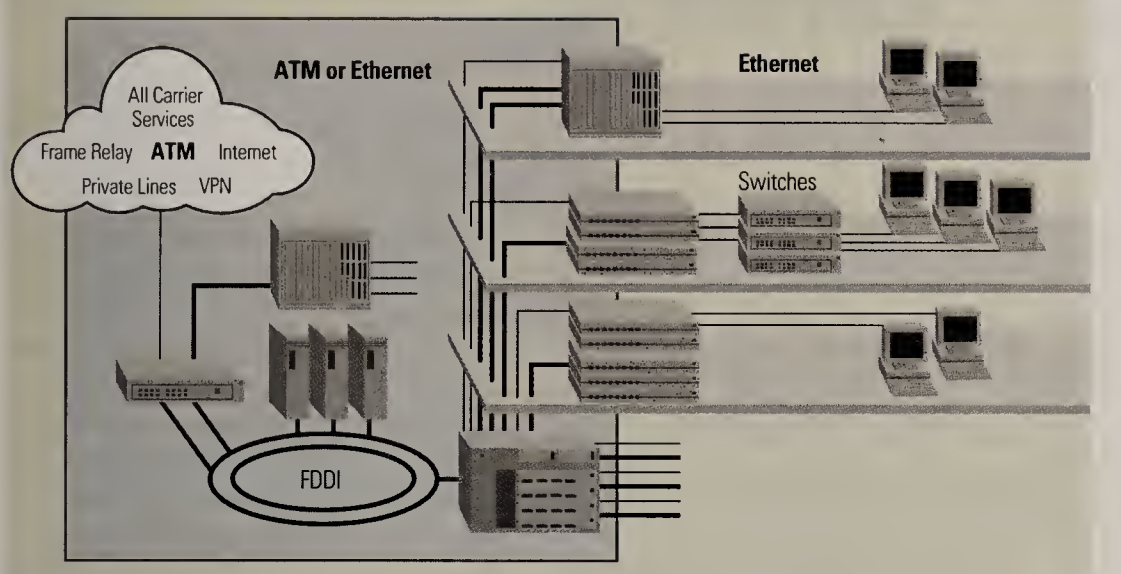
Deploy ATM where:

- Network scalability and resiliency are foremost concerns
- Complex topologies without Layer 3 routing is required
- One infrastructure for all data, voice and video needs is desired, requiring explicit QoS guarantees
- Seamless connectivity from "WAN in" and LAN-to-WAN switching are important

Consider the following hybrid models:

- 10/100/1000-Mbps Ethernet connections on each floor of a building with ATM deployed for the building backbone
- 10/100/1000-Mbps Ethernet intra-building connections with ATM deployed for the campus backbone

Fig. 1 ATM and Gigabit Ethernet



and to attain speeds that, until recently, exceeded the limits of bus-based, packet-switching architectures. ATM architecture is highly scalable—one protocol works for all speeds, from 1.5 Mbps to 2.4 Gbps, both within the campus network and across the WAN. An ATM network can be expanded simply by adding more switches. In addition to scalability in size and speed, the topologies possible with ATM offer inherent scalability for backbone networks, including the ability to add switches flexibly in the network, provide parallel load sharing on links and have multiple paths for route diversity.

But because ATM is connection-oriented, it has had to overcome challenges to interoperate with the installed base of packet-based, connectionless Ethernet LANs. Technologies and protocols such as the ATM Forum's LAN Emulation (LANE) allow an ATM network to emulate a LAN and thus connect to Ethernet desktops.

With these services, an ATM network appears as a broadcast LAN to the Ethernet devices and end stations. ATM is now the only technology with a standardized VLAN capability that has also been deployed in the field. But while ATM can deliver LAN-like services and standards-based VLANs, these capabilities require additional cost and complexity.

Gigabit Ethernet and ATM: A Place for Each

Any comparison of Gigabit Ethernet and ATM must also consider the respective roles the two technologies play in enterprise networks. Most desktops are 10Base-T Ethernet, and in corporate environments, many will migrate to 100Base-T. In contrast, the wide area network is becoming increasingly ATM-oriented. Many of the installed backbone frame relay switches in North America today operate with ATM switching matrices. Worldwide, private ATM services are becoming increasingly available and public ATM services will soon become available and competitively priced. In the future, ATM will provide the fundamental infrastructure for the delivery of Frame Relay, ISDN and DSL, as well as native ATM services.

Within the overall enterprise network, it is not a question of either ATM or Ethernet; they coexist and complement each other. The enterprise desktop will remain Ethernet-based, while the enterprise WAN will become increasingly ATM (see Figure 1). The desktop and the WAN meet at the backbone—both at the campus and building backbone levels. Within the backbone, the point at which ATM and Ethernet will meet will depend on cost and the applications and services required, as well as on network size, topology and redundancy requirements.

From the ATM perspective, the issue of ATM versus Gigabit Ethernet becomes a question of how far into the backbone the ATM "cloud" penetrates. From the Ethernet perspective, the question becomes how far toward the WAN will Ethernet—at 10, 100, or 1000 Mbps—extend?

The answer to those questions will vary from network to network and change over time. Both technologies are still evolving and adapting to new business requirements. For example, ATM LAN Emulation standards are evolving to improve scalability and performance, while new, emerging IEEE and IETF standards applicable to Gigabit Ethernet will improve Ethernet's Class of Service (CoS) and Quality of Service (QoS) capabilities. Moreover, products are being developed today to integrate ATM and Gigabit Ethernet CoS and QoS, promising true end-to-end support for time-critical applications.

A Strong, Shared Future...in Switching

The underlying reality is that Gigabit Ethernet and ATM are complementary technologies that were originally designed for very different needs. They should be evaluated based on specific network requirements and can be deployed together to optimize network performance and cost. For many implementations, Gigabit Ethernet and ATM will coexist within the same enterprise network. Both have a strong future in the marketplace.▪

Policy-based Services for Ethernet Networks

Bob Gohn

There's much more to the evolution of Ethernet than the dramatic increase in bandwidth afforded by Gigabit Ethernet. Methods are emerging to enable an Ethernet network to provide different service levels and service policies, moving Ethernet beyond the "best effort," evenly-shared access models of today's LANs. The demand for these capabilities is driven by technology requirements, such as the need to support desktop video-conferencing and other multimedia applications. Business considerations, such as the need to give critical network-dependent applications priority access to network bandwidth, are also helping move Ethernet in this direction (see Figure 1).

As reported in The Burton Group's Gigabit Ethernet Report (May 1997), "...the Gigabit Ethernet switches coming to market have features that expand Ethernet from being simply a 'dumb' high-speed technology to one that can function as an 'intelligent' network. These features include standards-based VLANs, quality of service/class of service, multicasting, congestion control and Web-based management."

Defining Class of Service/Quality of Service

While there's been no shortage of terminology describing the services required on the LAN, it is helpful to define the two that are most often discussed—Class of Service (CoS) and Quality of Service (QoS).

CoS implies prioritization of clearly defined types of traffic through the network. This is important at network congestion points, where decisions to delay or even drop certain packets can be prioritized by switches and routers. Applications requiring differentiated CoS include transaction processing, streaming video and other time-sensitive traffic.

The desire to provide priority is based less on technical requirements than on business imperatives. For example, a financial institution might want to be sure that traders always receive the fastest network response, no matter what application they may be using.

Some CoS capabilities have long been offered by traditional routers for the WAN, by using the router's Layer 3 intelligence to place high-priority traffic ahead of other traffic on outbound queues. For example, time-sensitive SNA traffic can receive a higher priority than TCP/IP traffic through the WAN.

Building on this technique, 3Com's PACE™ technology extended priority into the LAN, providing priority between two network elements—the end station and the switch. Third-generation schemes such as 802.1p and 802.1Q will deliver end-to-end priority across multiple networks.

While CoS implies simple prioritization, Quality of Service (QoS) implies a greater guarantee of bandwidth, as well as some assurance of latency and jitter characteristics. Providing explicit QoS, where latency and jitter are fully predictable and guaranteed, remains in the domain of ATM technology. With ATM, the combination of smaller transport units (53-byte cells versus packets ranging from 64 to over 1500 bytes), end-to-end per virtual circuit signaling and flow control allows assured delay characteristics even through very large networks. This is not possible with packet-based networks. By integrating ATM in the WAN, such connections can be extended end to end across the wide area.

Fig. 1 Business Needs Are Increasing the Complexity of Next-Generation Networks



QoS Options for Ethernet Networks

Today, protocols and switch technologies are emerging that allow Ethernet-based QoS characteristics to be implemented in local area networks. One such example is the Resource ReSerVation Protocol (RSVP), an end-to-end signaling protocol that enables an end station to request the reservation of guaranteed bandwidth through the network.

RSVP operates at Layer 3 for IP-based data flows. RSVP-enabled Layer 3 switches and WAN routers maintain multiple priority queues, much like 802.1Q/p-enabled switches. However, beyond simple prioritization, these devices should actually reserve and police the bandwidth requested for each RSVP session. Policing means ensuring that an RSVP session uses only as much bandwidth as it requested.

While CPU-based routers have been able to perform these functions for slow WAN links, only the newest generation of Layer 3 switches (such as 3Com's CoreBuilder 3500) have implemented these complex algorithms in silicon, ensuring that performance remains unaffected. These switches can classify traffic on the basis of specific policy requirements, using any number of different criteria (MAC address, IP address/subnet/port, protocol type, etc.) and apply the configured bandwidth and/or security constraints.

RSVP and other advanced bandwidth management capabilities do not offer explicit QoS capabilities, as in the cell-based world. But when combined with scalable bandwidth (such as Gigabit Ethernet), they are more than adequate for many emerging applications. These services can be effective "on-ramps" to larger ATM backbone and/or WAN connections.

Whether it's simple CoS or advanced QoS techniques, it is often desirable for the end station to request the desired service from the network. Using new, built-in WinSock and other API interfaces, elements of 3Com's TranscendWare™ software, such as Dynamic *Access*™ features, will allow management of these priorities, so even applications that are not "priority-aware" can take advantage of their benefits.

Today, protocols and switch technologies are emerging that allow Ethernet-based QoS characteristics to be implemented in local area networks

As the business requirements for differentiated service policies from the LAN increase along with the need for bandwidth, the switching and related technologies are "growing up" to meet these challenges. Network intelligence is needed not only for control but also to simplify the seemingly complex world emerging around us in the information age. Automated network control through service level policies will improve network performance, security and resiliency, and lower the overall cost of network ownership.■

Gigabit Ethernet and System Intelligence

Gigabit Ethernet becomes more than just a larger pipe for basic network connectivity with 3Com's advanced systems functionality. 3Com adds value to high-speed, switched LAN infrastructures by leveraging its TranscendWare™ intelligent software to provide the benefits of policy-based networking. These capabilities provide a total solution for addressing the foremost customer network objective today: an affordable, simplified, and full-controlled means to upgrade network infrastructures, while supporting advanced applications and more users.

TranscendWare software modules running on management consoles and integrated into 3Com devices allow managers to achieve three key objectives:

- **Network Control** 3Com's Gigabit ready products implement control for better performance, security, resiliency and cost containment.
- **Global Policy** 3Com Gigabit Ethernet solutions rely on quality of service and class of service policies for network applications and operation.
- **Pervasive Management** 3Com's Gigabit Ethernet system uses application management software to dynamically and automatically monitor and maintain control over the entire end-to-end network.■

Switching and Routing—Everything in Between

Bob Gohn

Bridging or routing? The age-old networking debate keeps resurfacing as network managers assess the speed, simplicity and lower cost of Layer 2 switching (bridging) against the greater network control afforded by routing technology.

In the wide area, the high recurring costs and relatively low speeds of WAN links make it easy to justify the cost and management burdens of routers. These "general purpose" routers were often adopted in the campus, but in recent years LAN switches have either replaced or, more frequently, "front-ended" routers providing significant price/performance and density advantages.

However, new requirements emerging in the campus are challenging this arrangement. A renewed focus on network control reflects how networks have grown—in both size and importance—and how responses to familiar problems like broadcast containment, security and support for complex topologies have changed since routers first came on the scene.

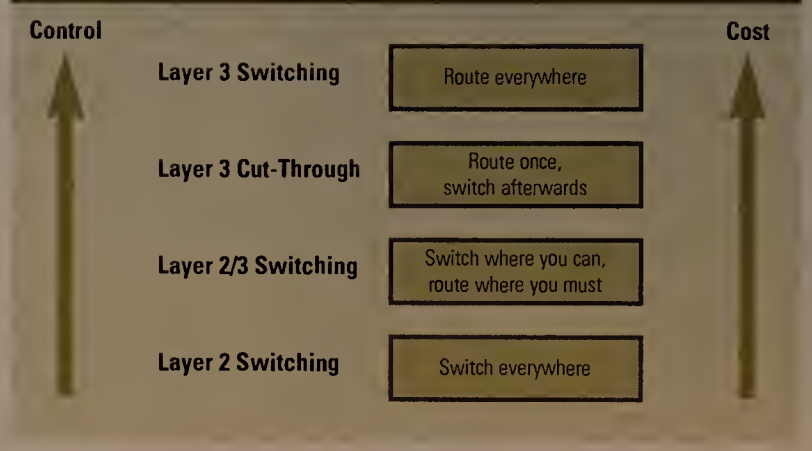
At the same time, exploding bandwidth demands have led to the evolution in LAN technologies, such as Gigabit Ethernet. Since high-speed technologies like Gigabit Ethernet will put additional pressure on the forwarding requirements of the core and surrounding devices, the big question in the industry is whether traditional routers will be able to keep pace.

The performance gap—in both throughput and packet processing—between high-performance LAN switches and general-purpose routers in the campus enterprise network is widening fast. Other issues contribute to this mismatch:

- With the rise of corporate intranets, unpredictable "any-to-any" traffic patterns are replacing standard "80% local/20% backbone" traffic planning assumptions.
- Class and quality of service guarantees are needed to support emerging multimedia services without affecting response times of existing mission-critical applications.
- Organizations need to leverage their existing network infrastructures while simultaneously "future-proofing" new investments.

What's emerged in reaction to all of this is a cacophony of new buzzwords and solutions, including "IP switching," "cut-through routing," and a new focus on a class of products known as Layer 3 switches. So what's behind these techniques? What value do they bring? Which is the right approach? As usual, network managers cannot assume a "one size fits all" solution for network control—there are tradeoffs to be made. These tradeoffs can be examined by organizing the various approaches into a taxonomy (classification), as shown in Figure 1.

Fig. 1 Options for Adding Network Control



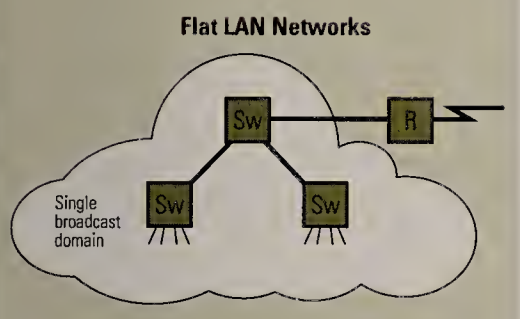
Switch Everywhere (Figure 2)
The "switch everywhere" approach moves the routing function out of the LAN entirely; routing is applied only to WAN connections. Since all LAN traffic is switched, this is the highest-performance and lowest-cost option. It "flattens" the network—i.e., it removes subnets—and allows end stations access to any part of the LAN without router latencies or controls. Certain aspects of network management, particularly adds/moves/changes, are greatly simplified, since end station addressing is independent of physical location.

Evolving this type of network to Gigabit Ethernet speeds requires no major architectural changes. By simply adding bandwidth, the "any-to-any" intranet traffic patterns are easily supported. New LAN switch features, such as IP Multicast "snooping" techniques (e.g., 3Com's AutoCast VLANs), can limit the effects of multimedia multicast and broadcast traffic flooding the entire network.

But this approach has limitations. Since there is no inherent broadcast containment, the widespread propagation of broadcasts can waste precious bandwidth in large networks. Even worse, desktop CPU cycles are potentially wasted as each end station processes each broadcast. Large flat networks can also be difficult to troubleshoot, and advanced security can be difficult to implement. Additionally, organizations may not have the address space to implement a completely flat network. As networks grow, some level of Layer 3 control is usually required.

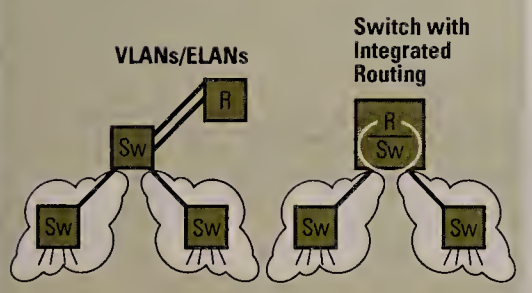
Switch Where You Can, Route Where You Must (Figure 3)
This approach leverages the simplicity of a flat, switched network, but implements routing where necessary for security, broadcast containment or address management. The primary design goal is to limit the amount of traffic that requires routing in order to increase performance

Fig. 2 **Switch Everywhere**



Network managers cannot assume a one-size-fits-all solution

Fig. 3 **Switch Where You Can**



and reduce routing administration costs while maintaining wire-speed switching between end systems on the same logical subnet.

If traffic flows are predictable enough that the network can be designed to keep 70 to 80 percent of the traffic within specific logical groups, virtual LANs (VLANs) can be used to create these logical groups. The router's role is then to move traffic between the VLANs. This allows intra-workgroup performance to scale with additional bandwidth, while trading off some performance between workgroups as traffic passes through the legacy router. Traffic through the router can be further reduced by configuring servers to be members of more than one VLAN, giving multiple workgroups access to server data without traversing a router.

However, some organizations cannot always predict and limit inter-subnet or inter-VLAN traffic. In emerging intranet environments, where users access information from many different servers distributed throughout the enterprise, traffic flows are often unpredictable and unstable. In such instances, the router may become the bottleneck to network performance.

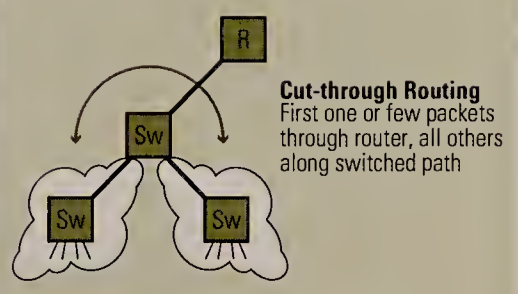
Route Once, Switch Afterwards (Figure 4)

The "route once, switch afterwards" option is new, incorporating a variety of proposed techniques like "IP switching" and "cut-through routing." The consistent theme for these techniques is that communication between end systems on separate subnets initially flows through the routers, with subsequent traffic "shortcut" to the faster switched path. These techniques vary in how the shortcut is initiated. Some leverage the end stations, some use intervening or special switches or routers, others do some combination.

One such technique is 3Com's Fast IP. It is based on the IETF Internet draft Next Hop Resolution Protocol (NHRP), and is run on the end systems. Since the Fast IP connection requests flow through the normal routed path, connectivity remains governed by router-based policies implemented in the network. The Fast IP response and all subsequent communications travel over the switched path, optimizing performance.

The benefits of "route once, switch afterwards" approaches are clear: faster, high-bandwidth paths are used for both intra- and inter-subnet traffic. The scalability, cost and migration options vary by vendor and technique. The optimal solution is one which works over existing switches and routers.

Fig. 4 **Route Once, Switch Afterwards**



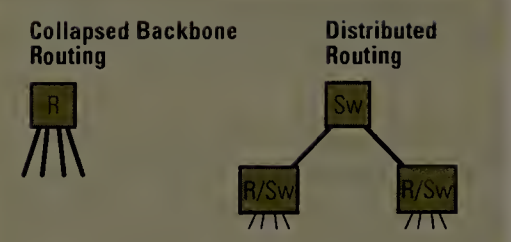
Route Everywhere(Figure 5)
The "route everywhere" philosophy advocates the use of devices that perform full packet-by-packet routing functions. Past solutions used general-purpose routers or first- or second-generation Layer 3 switches with integrated switching and routing capabilities. First-generation Layer 3 switches, similar to general purpose routers, were based on CPU architectures that provided flexibility, but limited performance to under 100,000 packets per second (pps) for both switching and routing. Second-generation Layer 3 switches added advanced silicon technology to boost overall performance dramatically. A new third generation of Layer 3 switches is emerging, offering dramatic price/performance advantages and advanced network policy functions.

These new Layer 3 switches support Gigabit Ethernet speeds and provide wire-speed routing. For example, the 3Com CoreBuilder 3500 supports up to 4 Mpps of IP and IPX routing, and the CoreBuilder 9000 will scale beyond 50 Mpps. In addition to supporting new LAN technologies like Gigabit Ethernet, these switches also support existing backbone technologies, such as ATM and FDDI. This enables users to leverage their installed infrastructures for the ultimate in network integration and support. Network policy support includes LAN-based Class of Service and Quality of Service, advanced security and automated network management.

With the introduction of advanced, highly evolved switching/routing capabilities, Layer 3 switches represent a dramatic shift in the "route everywhere" model. With unprecedented speeds, simplified network control and LAN-based policy services, these switches will eventually replace most general-purpose routers in the LAN core. These switches, however, will cost more than Layer 2 switches.

Is There a "Best" Approach?
The best solution for a given campus network depends on the specific performance, control and application requirements, as well as on the size and growth projections of the network.

Fig. 5 Route Everywhere



It is likely that the approaches to network control will be combined within a campus to provide a customized balance between cost and control. For instance, a network manager may combine elements of each: low-cost, high-performance Layer 2 switches, VLANs for broadcast containment, wire-speed Layer 3 switches for inter-VLAN connectivity and cut-through routing for optimization of overall switch capacity.

Either way, network managers would be wise to start planning their network control strategy based on today's network environments and the emerging pressure on LAN routers to keep up to speed. Gigabit Ethernet is certain to drive some level of Layer 3 functionality into the network. It's up to you to decide the best approach for your network.■

	Legacy Router	CoreBuilder 3500 High-Function Layer 3 Switch
Performance	500 k–1 Mpps	4 Mpps
Cost	Up to $250,000+	Up to $30,000
Policy Services	Limited	Extensive
Host Mobility	Only knows network addresses	Knows host and network addresses
Purpose	General purpose w/overhead	Designed to optimize LAN core



3Com's End-to-End Gigabit Ethernet Solutions

3Com's Gigabit Ethernet system is the first to offer:

- Scalable, fully integrated 10/100/1000-Mbps end-to-end system.
- Coexistence of ATM and Gigabit Ethernet technologies across the network and a full range of solutions.
- Switched FDDI-to-Gigabit Ethernet connectivity.
- Forward compatibility with existing products—for example, leveraging 3Com's installed base of 22 million SuperStack II users.
- Integration of TranscendWare software for network control and intelligence.
- Guaranteed interoperability with the final ratified standard.

3Com's standards-based Gigabit Ethernet products will be manageable with 3Com's Transcend Enterprise Manager. Products include:

Stackable Switching Solutions

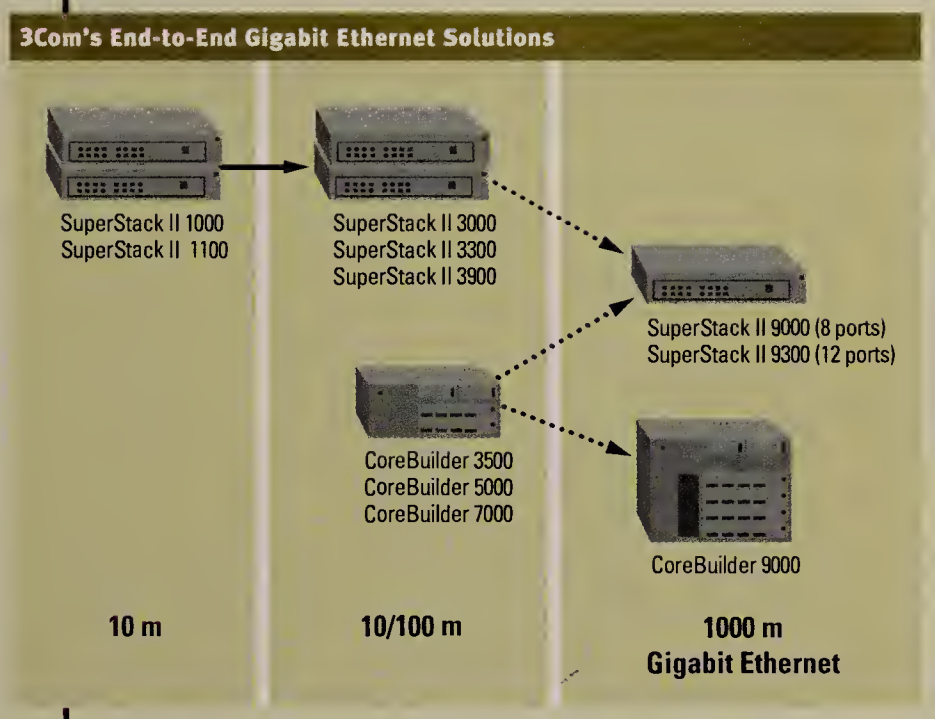
- SuperStack® II Switch 3900
- SuperStack® II Switch 9300
- SuperStack® II Switch 9000 SX Gigabit Ethernet Switch
- SuperStack® II Switch Gigabit Ethernet SX Module for the SuperStack II 1000, 3000 and Desktop Switch

Chassis Switching Solutions

- CoreBuilder™ 3500 Gigabit Ethernet Module
- CoreBuilder™ 5000 Gigabit Ethernet Module
- CoreBuilder™ 7000 HD 7800 Gigabit Ethernet Interface Card
- CoreBuilder™ 9000 Enterprise Switch

High-End Server Solution

- Gigabit EtherLink® Server Network Interface Card (NIC)



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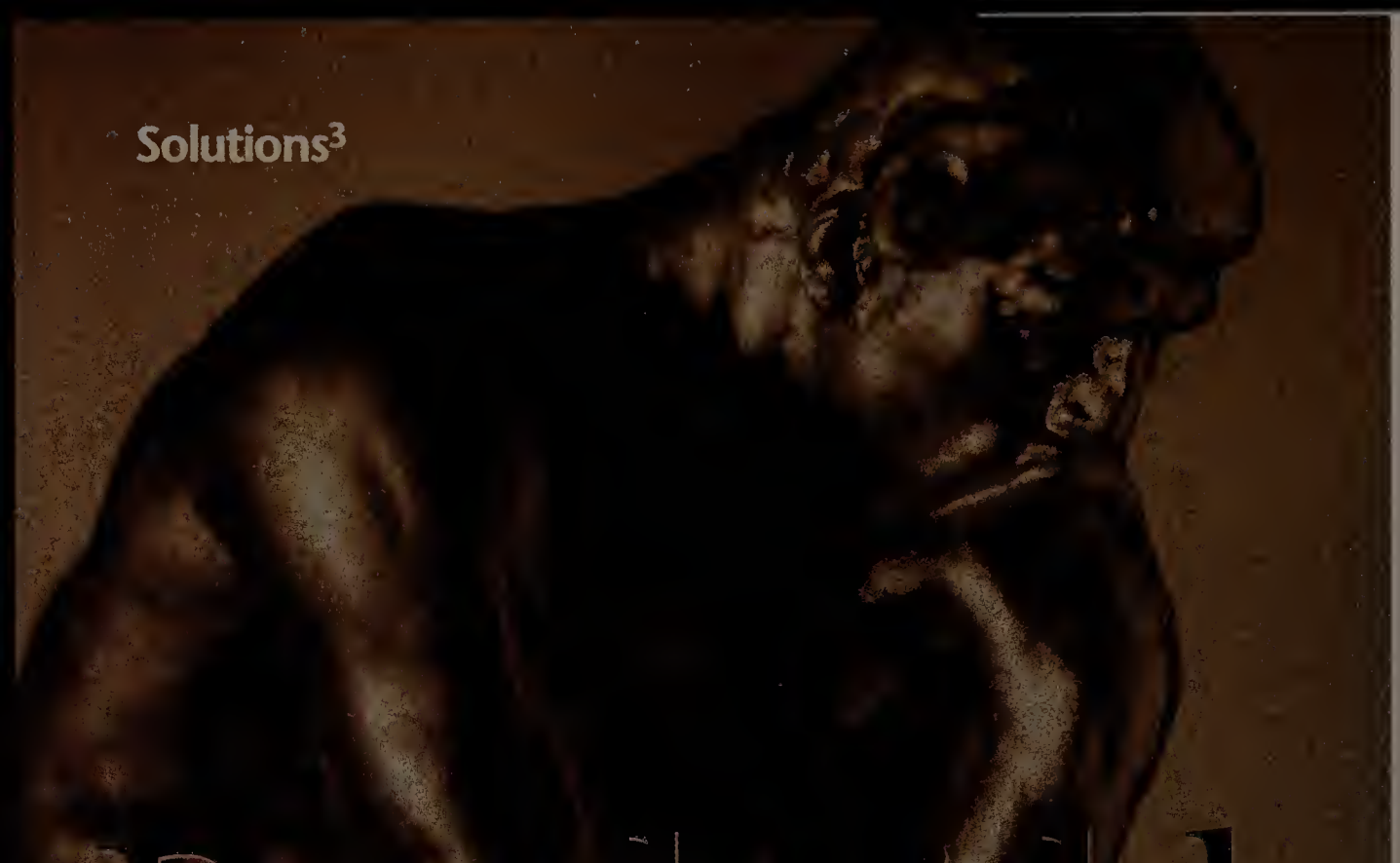
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3Com offers the industry's broadest Gigabit solutions, from award-winning Layer 3 switching, to the industry's fastest stackable Gigabit Ethernet switches. Powered by built-in TranscendWare™ software, 3Com's Gigabit Ethernet solutions allow you to intelligently optimize and control bandwidth, increasing the performance of mission-critical business applications.

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Local Networks

Covering: LAN Hubs, Switches and Management • Operating Systems • Servers • Thin Clients

Briefs

■ **Funk Software, Inc.** *has upgraded its* **AppMeter software.** *The product now can meter and control Windows and DOS application usage on Windows NT or NetWare networks. The cross-platform support lets a net administrator control software usage across an enterprise network from a single console. AppMeter II includes new reporting tools that provide printed documentation of enterprise software licensing compliance.*



AppMeter II is available now starting at $695 for a single-server/25 end-user license.

✆ Funk: (617) 497-6339

■ **Novell, Inc.** *last week set pricing for its newly announced* **ZENWorks** *suite of directory-enabled Windows PC management tools at $39 per desktop. ZENWorks comprises workstation management, software distribution and help desk integration tools that tap into Novell Directory Services (*NW, *Feb. 16, page 8). Together the tools give network administrators the ability to manage thousands of desktops from a centralized directory console.*

✆ Novell: (800) 453-1267

■ **Intel Corp.** *has reduced prices on its line of* **Express switches and hubs,** *a result of improved manufacturing processes and Intel's use of more home-grown silicon in its products. The 10M/100M bit/sec Express 510T Switch, which was introduced in November at $199 per port, now is available at $154 per port. Intel's 24-port stackable 10M/100M bit/sec Express Hub, previously priced at $2,375, now costs $1,992; the 12-port version's price has fallen from $1,525 to $1,392. Intel did not reduce its Express router prices.*

✆ Intel: (800) 538-3373

Net equipment vendors spruce up trade-in plans

By Scott Lajoie

Cisco Systems, Inc. last year had 37 different trade-in programs aimed at enticing users of other companies' hubs, switches and routers to join the Cisco camp. Now, to make things easier for Cisco and its customers, the company has just one such program.

Intel Corp. started the year by consolidating a slew of trade-in programs and now only advertises its Fast Ethernet Trade-up Program on the company's Web page for network products.

Bay Networks, Inc. and other internetwork equipment vendors also are taking steps to make their trade-in programs more alluring.

Why all the activity now, given that trade-in programs have been around for years?

One big reason is that competition isn't getting any less fierce. Vendors need to do everything they can to make sticking with them attractive, especially as more products hit commodity status. Trade-ins can reward customers with discounts of 10% to 20% on new purchases of internetwork gear, such as Layer 3 and Gigabit Ethernet switches.

Vendors also are looking to improve the programs to cut administrative costs for themselves and busy customers.

Cisco CEO John Chambers recently called for his company to streamline its trade-in programs, said Mike Francini, Cisco's marketing director. Cisco's many trade-in programs were governed by different rules and administered by different departments, he said. Company officials now plan to play up Cisco's streamlined trade-in program via direct mailings to customers and on the company's Web site. The effort will be worth it because Cisco has signed many deals as a result of a good trade-in offers, Francini said.

Intel and Bay officials said they don't think trade-in programs typically swing many big deals one way or the other, but the programs do help customers get a better return on their investments.

Bay offers two trade-in programs. The company's Switch to Bay Program, similar to Cisco's Competitive Technology Migration Program, encourages customers to trade in competing technology to invest in Bay's newest products. To date, Bay has only offered rebate credit for Cisco products, which can fetch a customer up to $250 per router port. Starting in March, however, Bay will extend its program and offer $100-per-port trade-ins for the 3Com Corp. CoreBuilder 3500 switches.

Jim Richardson, network manager at Amylin Pharmaceuticals, Inc., in San Diego, said one of the resellers he deals with recommended the Switch to Bay Program. He did a little research on the World Wide Web and soon updated his Bay and 3Com hubs to Bay-Stack switches. Richardson didn't even have to return his old equipment; Bay took his word that he was upgrading.

Bay also boasts an Investment Protection Program, under which customers buying Bay products are guaranteed a percentage buyback value when looking to upgrade to more advanced products.

Whereas Cisco's and Bay's programs offer credit for the residual value of returned hubs, routers and switches, 3Com's program offers rebates tied to the new products being purchased. For instance, if a customer wishes to buy a new 12-port Switch 9300, that customer receives $900 regardless of the age of the comparable product being traded in.

Intel's Fast Ethernet Trade-up Program lets customers accumulate points for trade-ins. A customer buying a new Intel product can trade in an adapter card (worth one point), print server (three points), hub or switch (one point per port) and then use those points toward future product purchases. ■

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WINNING OVER THE CUSTOMER

Companies offer different programs to get users to upgrade to their newest products.

Company	Program	Step 1	Step 2
3Com	10/100/1000 Upgrade Program	Buy eligible 3Com product with pre-assigned rebate value	Trade in similar product to receive cash rebate
Bay	Switch to Bay Program	Trade in old Cisco or 3Com product	Receive credit to buy new Bay product
Cabletron	Switch-up Program	Trade in old Cabletron product	Negotiate credit with sales representative to buy new Cabletron product
Cisco	Competitive Technology Migration Program	Trade in old product from competitor	Receive credit to buy new Cisco product
Intel	Fast Ethernet Trade-up Program	Buy new Intel product	Send in similar products to receive points for additional Intel products

Wyse airs WBT Server terminals

Winterms promise smooth move to new Windows server.

By John Cox

San Jose, Calif.

Wyse Technology, Inc. last week introduced four terminals designed to tap into the Windows-based Terminal (WBT) Server due out from Microsoft Corp. later this year.

Current Wyse terminals use Citrix Systems, Inc.'s ICA protocol to link to a server outfitted with Citrix WinFrame, a multiuser version of Windows NT. The terminals also run Wyse's proprietary client operating system.

When WBT Server is released mid-year, ICA will be replaced or supplemented by Microsoft's Remote Desktop Protocol. The Wyse operating system software will be supplanted by a version of Microsoft's lightweight Windows CE operating system.

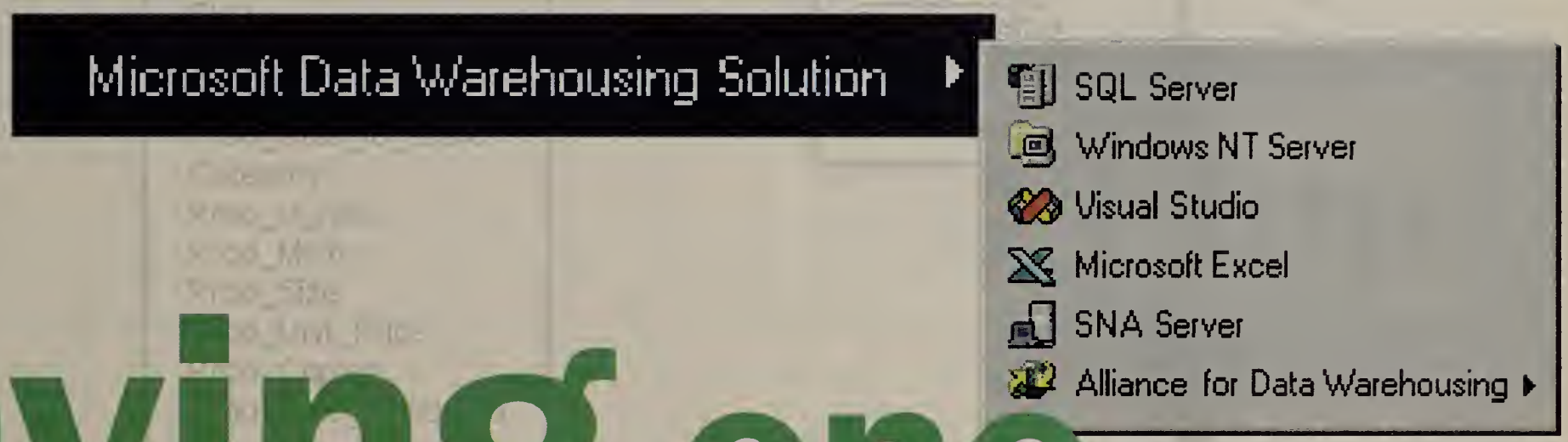
Wyse claimed the new terminals will be up to 100% faster than the models they replace, due partly to a faster microprocessor, the AMD Elan. Here's a summary of the new models:

- The Winterm 2310SE plugs into VGA monitors, supports resolutions up to 1,024 by 768 pixels and can handle up to 245 colors. It has a PCMCIA slot to accept various PC card peripherals and an Ethernet 10Base-T network port. The terminal will cost roughly $700.
- The Winterm 2510SE is an integrated unit — its software and processor reside in a 14-inch video display casing. The terminal supports SuperVGA resolution — up to 800 by 600 pixels and 256 colors. The device features a PCMCIA slot and an Ethernet port. It will cost around $900.
- The Model 2710SE also is an integrated model, with a 15-inch, flat-square screen and a resolution of 1,024 by 768 pixels. It will cost about $1,100.
- The Winterm 2610 will cost about $2,100, largely because of its screen display: a 12.1-inch active-matrix display panel, choice of touchscreens and a magnetic strip reader option.

✆ Wyse: (800) 438-9973

There's a big difference between wanting a data warehouse and

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Securing your IP network future

With IP now the protocol of choice for Windows NT customers and soon to be the default protocol for NetWare shops, there are a few things you might want to know about IP security.

While IP has a lot going for it, networks based on the technology are favorite targets for intruders.

Sure, most network and desktop operating systems can inform net managers if an unauthorized user tries to gain access. But the bigger security picture is detailed in a new white paper from Thomas Ptacek and Timothy Newsham of Secure Networks, in Calgary, Alberta.

The paper is called "Insertion, Evasion and Denial of Service: Eluding Network Intrusion Detection" and is available for viewing at www.secnet.com/papers/ids-html/doc001.html.

The white paper states that it's no longer intruders, but *intrusions,* that we need to guard against. The authors go on to define intrusions as any unauthorized usage or misuse of a computer system.

Ptacek and Newsham note that it is difficult to come up with a definition for intrusions based on descriptions put forth by intrusion detection system vendors. These companies tend to define only those attacks that their specific product guards against as intrusions.

As a result, the white paper settles on the Stuart Staniford-Chens Common Intrusion Detection Framework (http://seclab.cs.ucdavis.edu/cidf/). The definition was developed at the Defense Advanced Research Projects Agency's Information Technology Office as a basis for documenting the lengthy list of attacks that can be termed intrusions.



Dave Kearns

If reading that far into the white paper isn't enough to give you nightmares, read on about Ptacek and Newsham's evaluation of available intrusion detection systems. The authors concluded the following: "Our tests revealed serious flaws in each system we examined."

The paper ends by stating, "The number of attacks against network ID systems, and the relative simplicity of the problems that were actually demonstrated to be exploitable on the commercial systems we tested, indicates to us that network intrusion detection is not a mature technology. More research and testing needs to occur before network intrusion detection can be looked to as a reliable component in a security system."

So even if you're running IPX or NETBEUI as your network protocol, odds are you'll need to use or incorporate IP sooner or later. Knowing some of the risks you'll face should enable you to build as secure a system as possible.

Kearns, a former network administrator, is a freelance writer and consultant in Austin, Texas. He can be reached at wired@vquill.com.

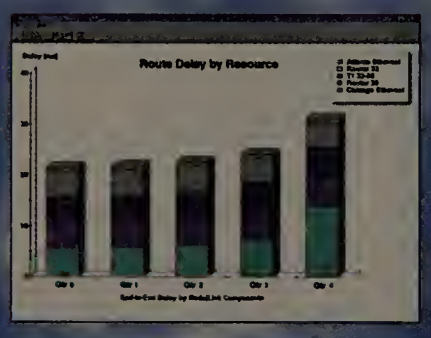
Tip of the week

Microsoft's Direct Access Web site is designed for resellers and consultants. But a new section could be useful to net managers charged with moving from NetWare to Windows NT. The Migrating from NetWare Resource Center (www.microsoft.com/partnering/directaccess/nwrc.htm) lists documents, guides and tools that can ease planning a move to NT and implementing the technology.

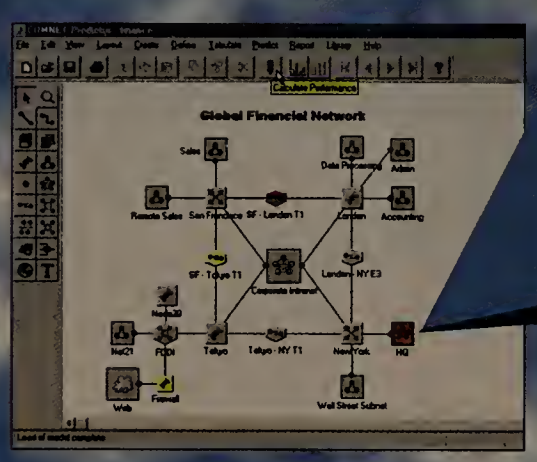
NETWORK CAPACITY PLANNING AND MODELING

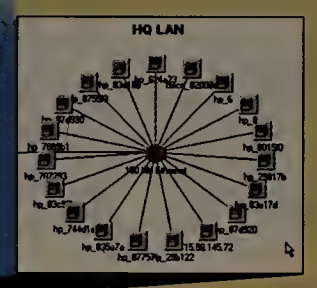
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Briefs

■ **IBM** *last week lowered the cost of owning or renting low-end* **3745 front-end processors.** *The 3745 Model 31A will now cost $111,900 to purchase — it previously cost $182,700. Renting Model 31A will cost $11,190 per month, down from $18,270. The 3745 Model 61A now costs $220,050 to purchase — it was $290,850. Renting Model 61A will cost $22,005 per month down from $29,085. Purchase prices are available immediately and rental prices start April 1.*

■ **Perle Systems, Inc.** *has added software to its Model 833 access server that makes it simpler and less expensive to* **authenticate remote dial-up users.** *The software allows the 833 to directly tap Microsoft*



Perle's *833 remote access server supports Windows NT Domain server authentication.*

Corp. Windows NT Server domain controllers to check user names and passwords. The feature ships with new 833 servers and is a free upgrade for existing users.

✆ Perle: (800) 467-3753

■ **Symplex Communications Corp.** *recently introduced* **Initiate FreeWAN Access,** *a feature that enables Internet remote access between Symplex Direct Route ISDN routers.*

When a user wishes to connect to a remote site, Initiate FreeWAN Access software first attempts to set up an Internet connection rather than directly dialing long distance. If the remote site is not connected to the 'Net, Initiate FreeWAN Access contacts the remote router via the ISDN signaling channel, which is free to the user.

The software costs $500 per seat.

✆ Symplex: (734) 995-1555

Bay unveils ATM backbone switch family

Based on NEC Netnex devices, new high-capacity boxes support voice and video.

By Jim Duffy
Santa Clara, Calif.

Bay Networks, Inc. last week rolled out a new line of ATM switches built by NEC Corporation, Inc., and added routing and voice support to its ATM devices.

The new switch line is called the Centillion 1000. It is designed for enterprise network centers requiring high-density 622M bit/sec OC-12 and 155M bit/sec OC-3 links.

The Centillion 1000 line is based on NEC's Netnex ATM switches (*NW,* Feb. 9, page 37) and is comprised of three modular chassis with 16, eight and four slots.

The 16-slot Centillion 1600 switch has a 10G bit/sec switch fabric supporting up to 64 OC-3 ports and 16 OC-12s. The eight-slot Centillion 1400 and the four-slot Centillion 1200 switches come with 5G bit/sec and 2.5G bit/sec nonblocking switch fabrics, respectively.

The competition

Topping out at 10G bit/sec, however, the Centillion 1000 line appears to fall short of competitive offerings, observers note.

FORE Systems, Inc. is close to unveiling a 40G bit/sec ASX-4000 switch, and Cisco Systems, Inc. has a 20G bit/sec ATM switch on tap under the code name Cougar (*NW,* July 28, 1997, page 1). Cabletron Systems, Inc.'s SmartSwitch 9000 sports a 75G bit/sec ATM cell switching fabric, the company claims.

Get more online:

- **An audio primer that explains ATM**
- **A review of ATM backbone switches**

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Bay will resolve the bandwidth issue toward year-end with an internally developed 20G to 40G bit/sec ATM switch, said Kevin Dillon, Bay's ATM product marketing manager.

In addition to OC-3 and OC-12 on singlemode and multimode fiber, the Centillion 1000 products support DS-3/E-3 and DS-1/E-1 links. The DS-1/E-1 processor can support the new voice integration features through circuit emulation.

Circuit emulation converts T-1/E-1 voice or video circuits to ATM cells for transport with data and video traffic across corporate intranets.

The Centillion 1000 ATM switches are expected to begin shipping in volume in March with prices starting at $15,900. The ATM DS-1/E-1 circuit emulation card is expected to begin shipping in April at a cost of $7,995.

For ATM routing, Bay added support for the ATM Forum's Private Network-to-Network Interface (PNNI) specification to its Centillion LAN/ATM switches. PNNI is a link-state, hierarchical dynamic routing protocol for ATM, which alleviates the need for network managers to use static routes or proprietary routing protocols, Bay said.

With PNNI, multivendor ATM switches can "discover" each other by exchanging PNNI topology information.

PNNI for the Centillion product line is expected to begin shipping in March.

✆ Bay: (408) 988-2400

Bay's ATM attack

- **Centillion 1000 switches**
  Sixteen-slot, 10G bit/sec Centillion 1600
  Eight-slot, 5G bit/sec Centillion 1400
  Four-slot, 2.5G bit/sec Centillion 1200
- **New features include voice integration via circuit emulation**
- **PNNI support for ATM routing in new and existing devices**

Motorola offers scalable branch office devices

By Tim Greene
Mansfield, Mass.

Motorola, Inc. last week wheeled out two modular remote office switch/routers designed to grow as bandwidth needs expand.

The Vanguard 6430 and 6450 support an array of WAN and LAN cards that allow users to change technologies in their remote office LANs and WANs without having to buy new chassis. In addition, the 6450 can be beefed up with feature cards that carry their own processing power. The 6450's motherboard is designed to be swapped out to provide more CPU power as needed.

"The general trend in these sorts of boxes is to offer as much flexibility as you can," said Abner Germanow, an analyst with International Data Corp., in Framingham, Mass. Previously, Motorola small-office wide-area gear was limited to simple frame relay access devices and DSUs/CSUs, Germanow said.

The new Motorola boxes can handle analog voice, video, DSU/CSU functions and ISDN. In addition, they support frame relay and ISDN over the wide area, and route IP, IPX and AppleTalk traffic from the LAN.

The 6430 has three slots and the 6450 has five. Both boxes switch, route and bridge remote traffic. The boxes are designed to use the same daughtercards that fit existing Motorola routers, so customers who already own a Motorola router can swap cards into the new devices as their needs change.

The 6450's two extra slots can take cards that feature their own Power PC 860 processors, offloading the CPU. A voice-over-IP and voice-over-frame relay card will be available initially, with a high-speed serial interface and ATM cards to come later.

The major cost in supporting WAN access from remote offices is the transport service bought from a carrier and managing the gear day-to-day, Germanow said. A hardware platform that can be upgraded keeps those costs low.

The major cost in supporting WAN access from remote offices is the transport service bought from a carrier and managing the gear day-to-day, Germanow said. A hardware platform that can be upgraded keeps those costs low.

"This provides value in the branch office by giving future flexibility," Germanow said. For example, if frame relay rates improve in the area where a remote office is located, the user would have the option to buy that service rather than, say, ISDN, he said.

Motorola expects the Vanguard boxes to serve as platforms that can impose class of service for packet traffic and, in the future, quality of service for ATM. Those service qualities would then be supported throughout the network by other Motorola gear.

Vanguard software allows a mix of data traffic with voice and video to be dropped onto a single frame relay link. To do that effectively, the box prioritizes traffic by type so the quality of delay-sensitive voice and video does not suffer.

Vendors that sell competing devices — Micom Communications Corp., ACT Networks, Inc., Memotec, Inc., Cisco Systems, Inc. and 3Com Corp. — tend to specialize in handling one type of traffic, Germanow said.

Currently in beta test, the two chassis ship at the end of March. The 6430 chassis costs $2,799, and the 6450 costs $3,495.

✆ Motorola: (508) 261-4000

INTERNETWORKING MONITOR

Which technology will win the campus backbone?

For the first time in a long time, network managers have a real choice of products from which to build their next-generation campus backbones.

But the choice between Gigabit Ethernet and ATM is not easy, and it is not clear whether frames or cells will prevail.

Gigabit Ethernet backbone switches with massive backplanes, high-port densities, low latency and relatively low prices are starting to roll off manufacturers' assembly lines and into customer sites. (Even though the IEEE standard is not officially in place.)

These switches can be dropped right into existing Ethernet/Fast Ethernet networks and can offer network managers a no-pain backbone upgrade option. At the same time, however, we are experiencing something of an ATM renaissance. After literally years of painstaking standards definition followed by complex code development, powerful, sophisticated and relatively easy-to-use ATM systems are ready for deployment. And unlike their frame-based brethren, the devices are architected to handle constant bit rate (CBR) services such as voice and interactive video on Day One.

In my view, it is in this area of "multiservices" that the frame vs. cell battle will be fought and won. While ATM certainly can provide the backbone for a pure data campus network, much of ATM's power would remain untapped. For such traditional data networks, fast frames — Gigabit Ethernet or High-Speed Token Ring — will do the job.



Kevin Tolly

For network managers intent on collapsing cross-campus or cross-country T-1 PBX links together, ATM clearly is the only viable option.

Streaming video — such as playing back a training CD-ROM — can be handled easily by cell- and frame-based networks. Surprisingly, bandwidth draw from such applications is quite low and latency is not usually an issue.

Interactive video is latency-sensitive and would, in theory at least, be better suited for ATM's CBR service than for transport over frames.

Many products demonstrate extremely low latency that, combined with raw bandwidth, should allow even CBR-type traffic to be handled satisfactorily across the switches. Still, interactive video remains a minor application for most and is unlikely to sway the frame vs. cell decision.

The wild card, in my view, is packetized voice. Referred to as voice over IP or voice over networks, the success or failure of this movement will significantly affect the frame vs. cell balance of power.

While voice is the classic example of a delay-sensitive, CBR application, the dramatic economic advantages of shipping that traffic over usage-insensitive data networks has made this an extremely hot area.

Network managers would do well to watch the voice-over-IP market closely for indicators as to whether the future belongs to frames or cells.

Tolly is president of The Tolly Group, a strategic consulting and independent testing firm in Manasquan, N.J. He can be reached at (732) 528-3300, ktolly@tolly.com or www.tolly.com.

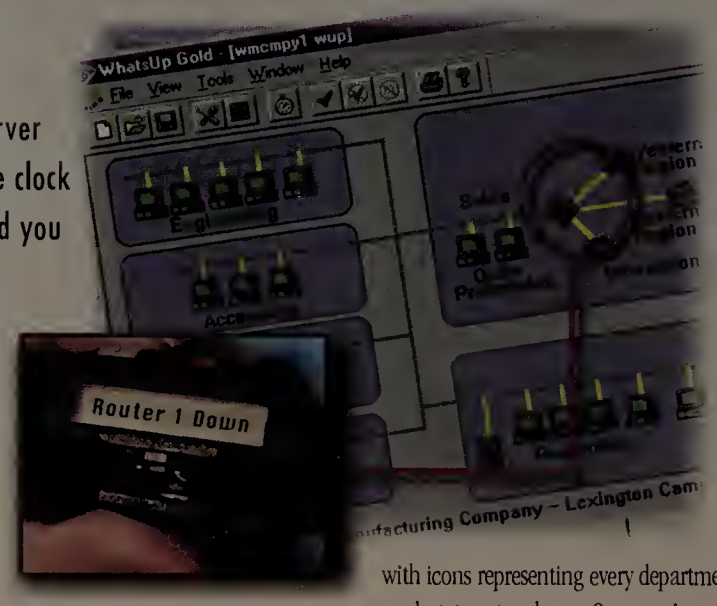


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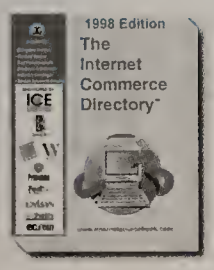
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❑ ICE Passport	Unlimited 4 Days Conference (except Executive Conference)	select 1 day from Box A, 3 days from Box C	$1,095	$1,195
❑ General Conference	All General Conference and Workshops March 24-26	select 3 days from Box C	$895	$995
❑ Executive Conference	March 22 Reception, March 23 Program, Luncheon and Reception	select Box B	$995	$1,095
❑ Half Day Tutorial	March 23	select T-4 to T-13 from Box A below	$295	$350
❑ Full Day Tutorial (or 2 x half day)	March 23	select 1 day from Box A below	$495	$595
❑ Single Day Workshop/Conference	March 24, 25, 26	select 1 day from Box C below	$395	$495
❑ Build Your Own 2 Day Conference	March 23 - 26, Excluding Executive Conference	select 2 days only from Box A and C	$750	$850
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❑ **Exhibits/Internet Open/Keynotes Only Pass March 24, 25, 26**			**FREE**	$ 50

Box A - Tutorial Selection - March 23

❑ T-1 An Introduction to the Internet & Business Applications	Full-day
❑ T-2 Developing Internet-Based Business Applications	Full-day
❑ T-3 All You Ever Wanted to Know About Networking & TCP/IP	Full-day
❑ T-4 The Law & the Web	Half-day a.m.
❑ T-5 Measuring Your Web Marketing: Maximizing Advertising Dollars	Half-day a.m.
❑ T-6 Using the Internet for Business	Half-day a.m.
❑ T-7 Intranets — The Keys to Success for Your Organization	Half-day a.m.
❑ T-8 Worldwide Web Marketing: It's a New Medium	Half-day a.m.
❑ T-9 What Makes People Click: Advertising on the Internet	Half-day p.m.
❑ T-10 Intranets — Design & Implementation	Half-day p.m.
❑ T-11 International & Electronic Commerce Aspects of Doing Business on the Net	Half-day p.m.
❑ T-12 Security Beyond the Internet	Half-day p.m.
❑ T-13 Training on the Web — Are you Ready?	Half-day p.m.

Box B - ❑ Executive Conference - March 22, 23

Box C - Single Day Conference & Workshop Selections - March 24,25,26

March 24
- ❑ S-1 Tuesday General Conference Program
- ❑ W-1 Webmaster's Guild Workshop
- ❑ W-2 Microsoft Workshop
- ❑ W-3 Dean Witter Price Waterhouse Workshop

March 25
- ❑ S-2 Wednesday General Conference Program
- ❑ W-4 IBM Workshop
- ❑ W-5 Intel Workshop

March 26
- ❑ S-3 Thursday General Conference Program

Box D - Certified Training Programs - March 25, 26
- ❑ C-1 Certified Internet Webmaster E-commerce Professional, March 25
- ❑ C-2 Certified Internet Webmaster Specialist, March 26

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March 25: Keynotes at 9:30a.m. & 1:00p.m.; Expo & The Internet Open 10:30a.m. - 5:00p.m.
March 26: Keynotes at 9:30a.m. & 1:00p.m.; Expo & The Internet Open 10:30a.m. - 3:00p.m.

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Briefs


Sen. McCain

■ **Senate Commerce Committee Chairman John McCain** *(R-Ariz.) has introduced a bill to beef up enforcement efforts against* **"slamming."** *Slamming is the practice of making unauthorized changes in users' long-distance carriers. This now is affecting consumers as well as business users (NW, Sept. 1, 1997, page 30).*

The bill, cosponsored by ranking Democratic committee member Ernest Hollings (D-S.C.) and two other senators, provides for expedited complaint procedures at the Federal Communications Commission, with penalties of at least $40,000 for the first violation and $150,000 for subsequent violations. "Slamming has to stop once and for all, and this bill means to stop it," McCain said.

■ *The stockholders of* **Shared Technologies Fairchild, Inc.,** *a shared-tenant telecom services company, have approved a merger with alternative local and long-distance carrier* **Intermedia Communications, Inc.** *The $366 million deal, announced in November, gives Intermedia control of 110,000 access lines in commercial buildings in 35 metropolitan areas.*

■ **UUNET Technologies, Inc.,** *WorldCom, Inc.'s Internet service provider division, has announced a* **new reseller program.** *The Fairfax, Va.-based ISP's Integrated Solutions Program will let small to mid-size business users buy UUNET's ISDN Internet access services bundled with Ascend Communications, Inc., 3Com Corp. and/or Whistle Communications hardware.*

UUNET is waving the typical ISDN service installation fee of $100 for its Integrated Solutions Program customers.

✆ UUNET: (703) 206-5600

Wireless phones get access boost

Unwired Planet teams with hardware vendors to make 'Net access easier for GSM users.

By Denise Pappalardo and Kristi Essick
Cannes, France

Alcatel Alsthom SA and Siemens last week separately inked deals with Unwired Planet, Inc. that will let domestic or international Global System for Mobile Communications (GSM) customers use their wireless handsets to check their e-mail or surf the World Wide Web.

Under its agreement, Alcatel, a major telecommunications equipment manufacturer, is equipping its The One Touch, GSM-based handsets, with Unwired Planet's UP.Browser software.

Siemens also is integrating Unwired Planet's software into its GSM 900, 1800 and 1900 handsets.

UP.Browser is part of Unwired Planet's UP.Link platform that also includes an Internet gateway (see graphic).

Unwired Planet, a Redwood Shores, Calif.-based software manufacturer, developed its wireless Internet access system software to support the Wireless Application Protocol (WAP), a specification for accessing Internet content over wireless networks.

Nokia Corp., Ericsson, Inc., Motorola, Inc. and Unwired Planet developed the WAP specification. Alcatel also plans to join the WAP Forum to work on further interoperability specifications for accessing IP content over wireless networks.

Some of the larger wireless equipment manufacturers have already backed the WAP specification, so it was imperative that companies such as Alcatel do the same, said Bob Egan, research director at the Gartner Group, Inc., a Stamford, Conn.-based consulting firm.

Alcatel and Siemens are not the first providers to integrate Unwired Planet's technology into its hardware, but they are the first to focus on GSM-based products. Mitsubishi Wireless Communications, Motorola, Qualcomm, Inc., Samsung Electronics Co. and Uniden SRC all have integrated the UP.Link platform into their wireless handsets.

While Code Division Multiple Access (CDMA)-based personal communications services dominate the domestic market, GSM is the most popular PCS technology internationally.

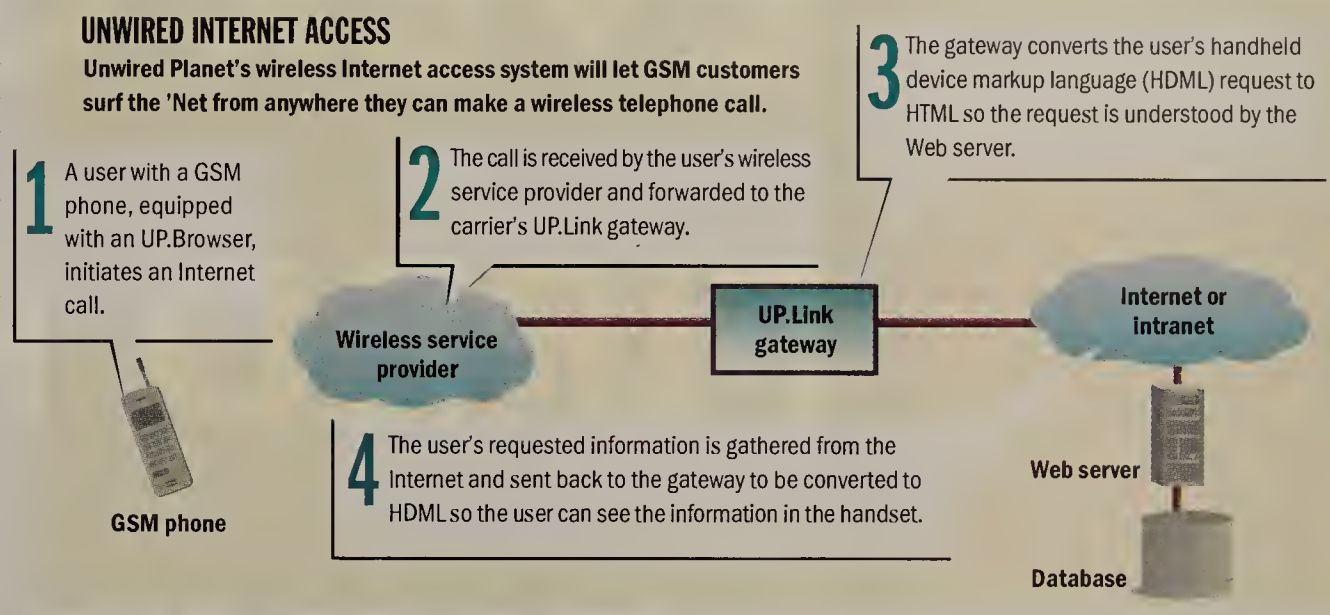
CDMA will have the lead in market share, but GSM wireless networks will be competitive, Egan said.

Alcatel plans to support efforts to create a global wireless Internet access service based on GSM networks, according to the company.

Essick is a correspondent with IDG News Service's London Bureau.

UNWIRED INTERNET ACCESS

Unwired Planet's wireless Internet access system will let GSM customers surf the 'Net from anywhere they can make a wireless telephone call.



Get more online:

- Technology overviews from Alcatel and Unwired Planet
- Specifications for the Wireless Application Protocol
- A look at a wireless transaction proposal

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Carriers are beefing up managed services

By Tim Greene

BellSouth Corp. and US WEST, Inc. are working with partners to develop new services aimed at helping users manage large-scale enterprises and access network-based applications.

BellSouth last week announced it would team with Electronic Data Systems, Inc. (EDS) to offer Managed Network Solutions (MNS), a range of services that will give corporations the option of outsourcing part or all of their network functions.

US WEST is signing up big name network partners including Microsoft Corp., Sun Microsystems, Inc. and Hewlett-Packard Co. to develop ways for customers to access software that resides on servers in the US WEST network rather than buying the software themselves.

Both carriers are trying to expand their services beyond simple data transport, with BellSouth focusing on assuming responsibility for network management through its affiliation with EDS.

Joint BellSouth-EDS services will range from managing LAN and WAN hardware to providing help desk functions and an array of common desktop applications, operating systems and utilities. These include browsers, virus scanners, Windows 95 and Microsoft Office.

MNS services will be available in two months.

US WEST has apps

Meanwhile, US WEST is hoping big businesses will want to buy access to applications that US WEST will host in its nationwide data network. The idea is to free customers from the hassle of managing and supporting the software themselves.

US WEST will host applications based on Microsoft's Windows NT, Sun's Java and Oracle Corp.'s Unix platforms.

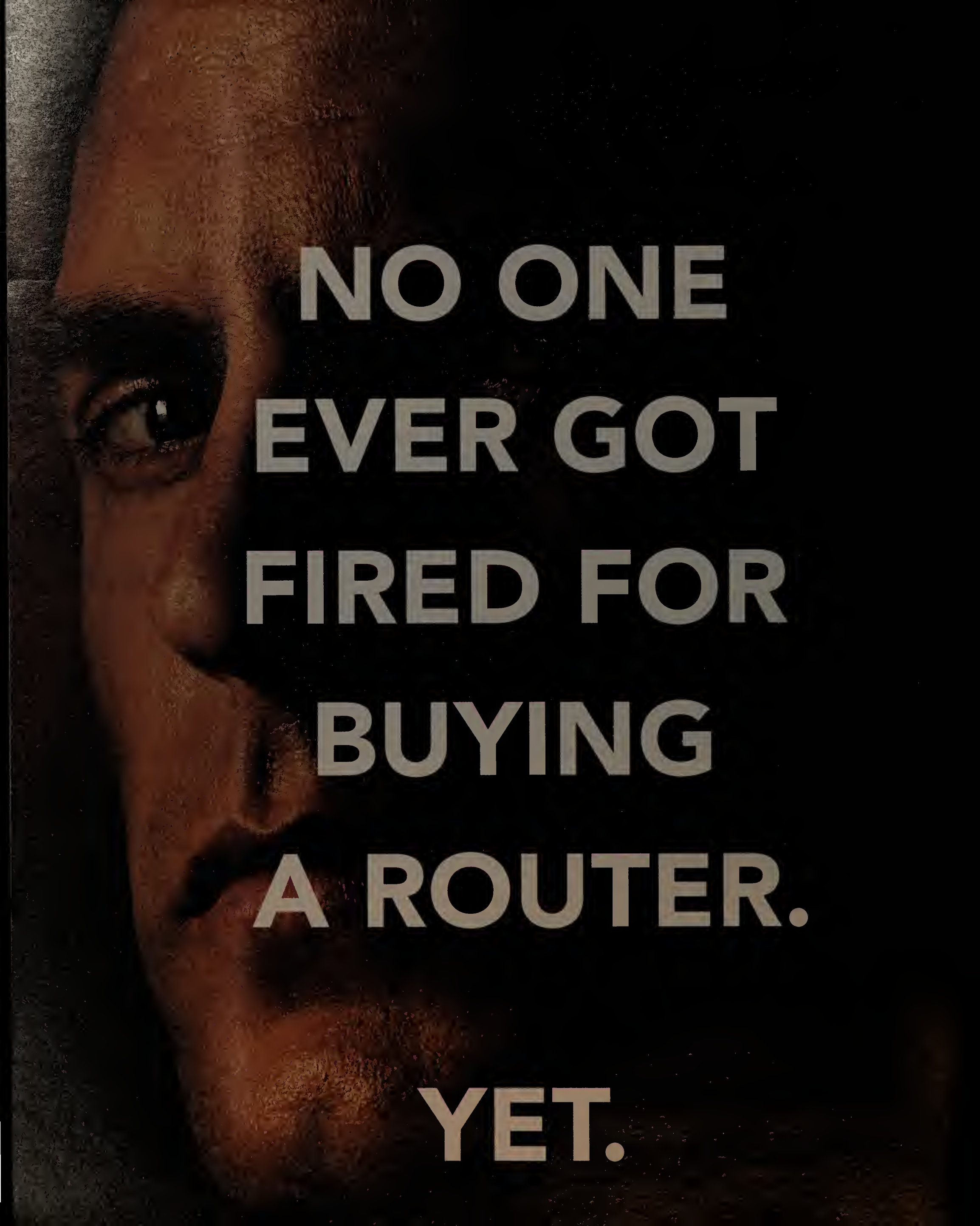
Applications will include directory services, electronic billing, virus scanning and site blocking. Customers will be able to pick and choose the applications they want.

For example, a customer who buys Internet access from US WEST also could sign up for Novell, Inc.'s Border Manager virus scan service. Any Internet downloads would be scanned for viruses on a server at the Internet service point of presence before being downloaded to the customer from the Internet.

US WEST is working with other companies, including Digital Equipment Corp., to develop new applications it can host.

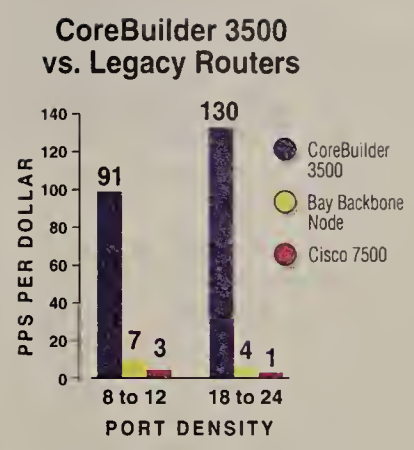
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✆ BellSouth: (800) 277-7792; US WEST: (800) 879-3282

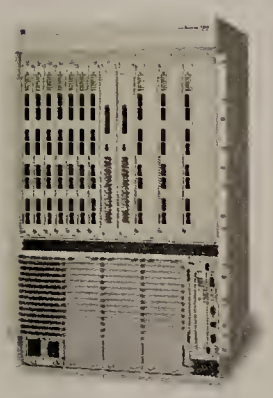

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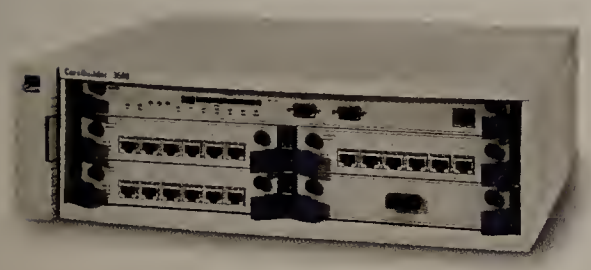


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EYE ON THE CARRIERS

AT&T should stay away from public relations games

Readers in the New York area may recall newspaper ads last year on the subject of telecommunications reform from a group calling itself New York Consumers for Economic Competition.



David Rohde

Now more bandwidth at lower prices from a bigger choice of service providers is a serious concern for professional network managers. But I think it's fair to say that most consumers and small businesses aren't wildly upset about the nation's phone system.

So it was weird to see the coalition's ads — demanding that Bell Atlantic do more to open up its network — signed by such groups as the Long Island Hispanic Chamber of Commerce, the Korean Produce Association and the Caribbean Women Uniting for Social and Political Action.

It's also strange that at around the same time, other groups popped up with names like New Jersey Coalition for Local Telephone Competition, Maryland Coalition for Local Competition and Californians for Telecommunications Choice.

All seemed to have a knack for knocking the RBOCs — the California group in particular drawing attention for controversial radio ads.

Enter a firm called Edelman Public Relations Worldwide. Edelman is one of the big names in the PR field, and one of its major clients is — you guessed it — AT&T.

Recently, Edelman Vice President Pamela Small confirmed that Edelman has a specific contract with AT&T to write letters to consumer, senior citizen and other groups to attempt to sign them up as members of these coalitions. "That would be a fair statement," said Small, a former top public relations executive for MCI, in Washington, D.C. "We do some grass-roots organizing for AT&T."

The letters to these groups identify AT&T as one of the coalition's contributors, Small said (although the California coalition's radio ads did not).

Some of the coalition members come voluntarily to AT&T, she added. "These aren't front groups," Small insists. Their purpose is to demand market-opening conditions so users can switch away from the dominant local carrier if they wish. Besides, Small adds, "the masters of this kind of stuff are the RBOCs."

Well, she's right about that. The cynical assembling of groups representing ethnic, senior and disabled populations to front for carriers' public policy positions is an RBOC specialty. But AT&T dived into this activity under former CEO Bob Allen at precisely the wrong time. Edelman and firms like it don't come cheap, and hiring them shows an obsession with the telecom policy mud pit that drains executive energy.

Allen seems to have misinterpreted the telecom legal stalemate to mean that local and national network needs would not radically change. But the bandwidth needs of users and ISPs don't stop and wait for declaration that the Telecommunications Act of 1996 is a success.

AT&T's No. 1 priority in 1997 should have been to crank up to meet booming demand. It did some of that, but not nearly enough.

Now new CEO Mike Armstrong has dumped AT&T's lazy network-upgrade strategy in favor of an edge switch architecture with real local facilities. Had Allen figured that out instead of playing "so's your mother" with the RBOCs, he could have bought Teleport in January 1997 for half the price that Armstrong paid in January 1998.

Unfortunately, AT&T now is paying a much bigger price for its complacency: It is caught short of ports and circuits, and users are suffering installation delays on their T-1 access orders.

It's an old lesson but one that bears repeating: Executive focus makes or breaks an organization. Let's hope Mike Armstrong spends 90% of his time and budget on getting AT&T fully up to speed, 10% on necessary attention to industry issues and none at all on stupid PR games.

Rohde is Network World *senior editor, Carriers & ISPs. He can be reached at david_rohde@nww.com.*



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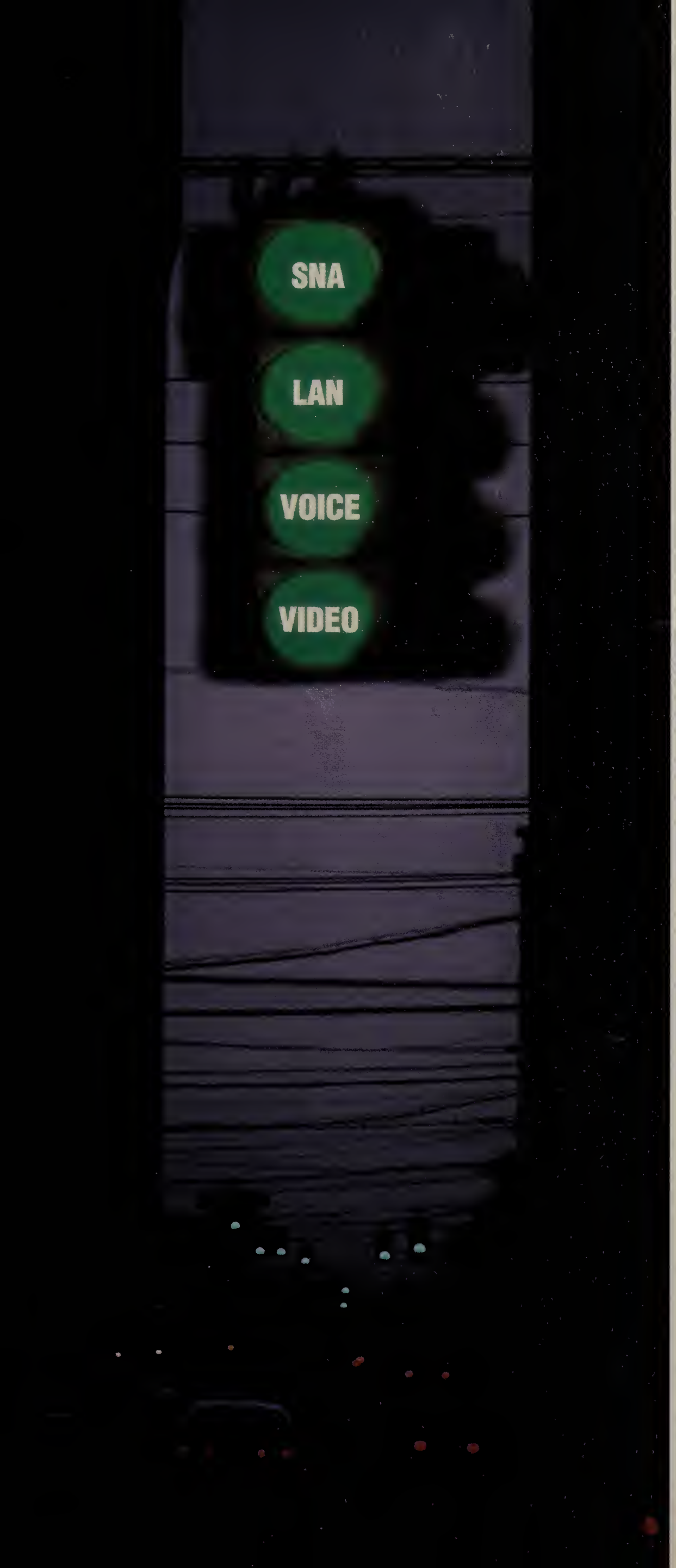
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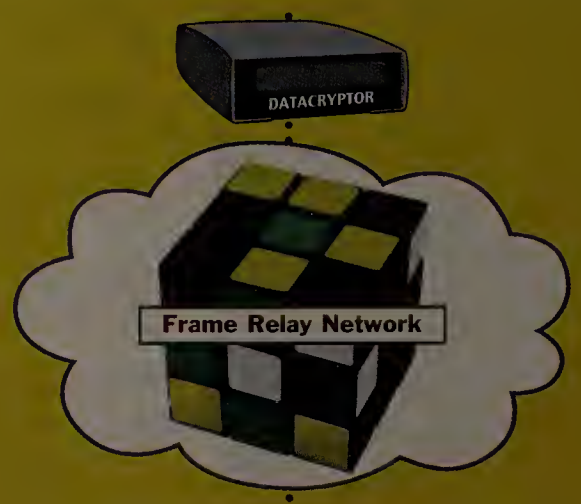
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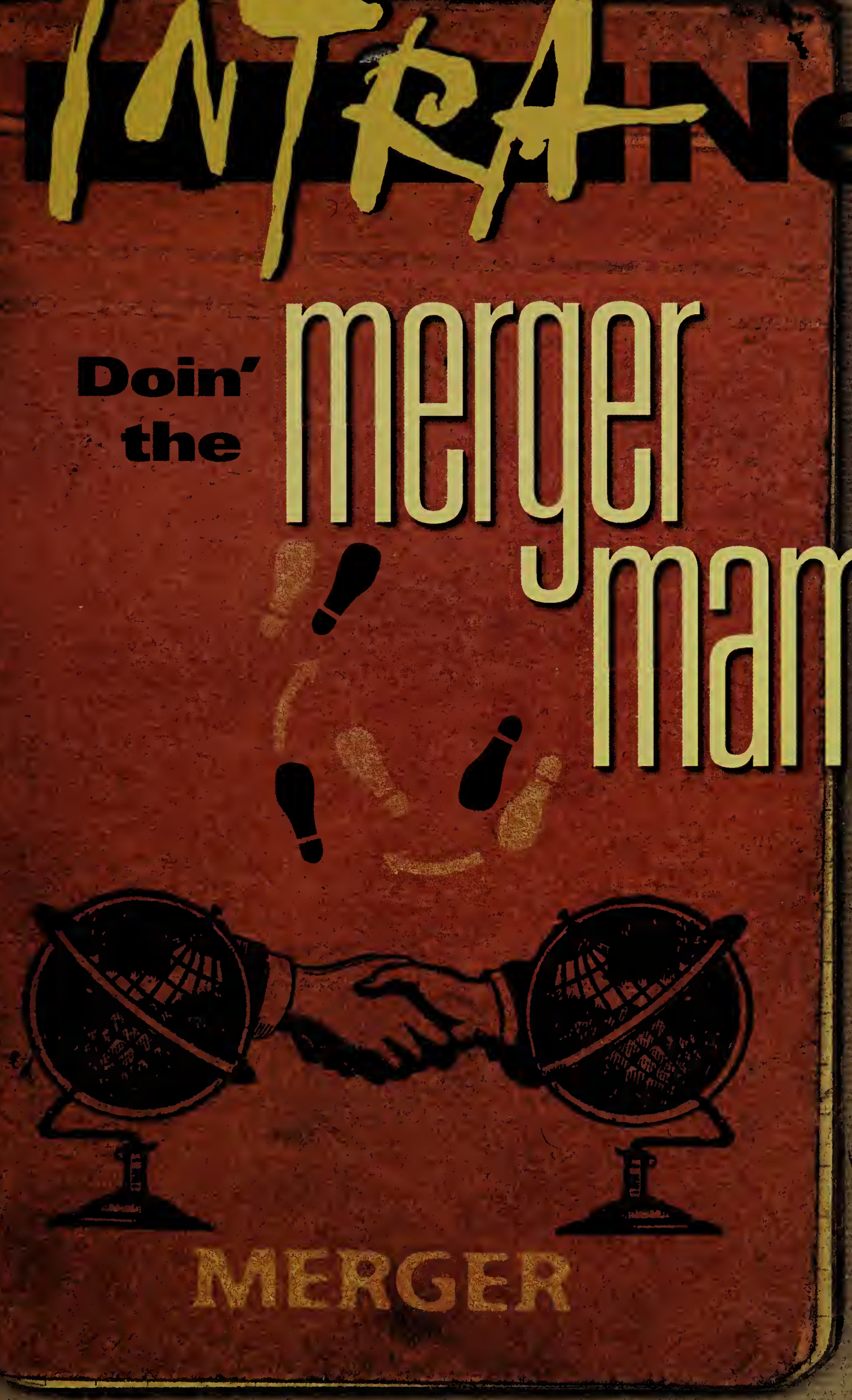
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IntraNet

Doin' the merger mambo



Intranets ease the task of teaching merged companies how to dance in step. Page 17.

ALSO INSIDE • The Xerox-Wide Web revisited • Picking a publishing package • Web-based collaborative tools

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INSIDE

IntraNet

February 1998
Volume 3, Number 2

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As folks at organizations such as 3Com and Boeing can attest, intranets and extranets can help companies synchronize their steps and help employees get into the beat after a merger or acquisition. Cover illustration by Marc Yankus.



13 Documenting progress at Xerox
In this, the first of an ongoing series revisiting intranets we've profiled, we take a second virtual tour through the Xerox-Wide Web and the corporate environment that gave rise to it. Web use is proliferating, but full corporate buy-in remains elusive.



16 Picking a publishing package
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21 Collaborative catchall
Intranets are migrating from static document libraries to dynamic platforms for shared observations, discussions, chats, conferences and workspaces, and that means new business challenges for IT managers.



26 Two rising stars: Intranets and e-mail
Ask Paul Hoffman, director of the Internet Mail Consortium, what the most important intranet application is and, for obvious reasons, he'll say e-mail. In this Q&A, Hoffman gives his take on the relationship between e-mail and intranets, two rising corporate stars.

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Your virtual connection to news bits, opinion, insight, humor and other marginalia from planet intranet.

Product Watch: Network computers 6
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IntraVert: Diversity and authority 27
Columnist Mark Gibbs exhorts IT managers to stay on top of intranet development or face withering away into corporate nothingness.

From the Editor

It's not uncommon to pick up a business periodical and read about intranets. I'm not talking about trend stories — there have been lots of those, to be sure. I'm referring to articles that casually mention intranets as basic business elements, just as they might mention a company's worldwide operations or lines of business.

I recall, for example, a recent story about 3Com changing its ad agency. I probably would have overlooked such a story but for the mention of a prominent network company as well as the fact that I was midair and had time to spare. But there, deep in the story, I stumbled across some intranet talk.

As it turns out, Foote, Cone & Belding grabbed 3Com's ad dollars in large part because of its intranet, through which it provides clients the ability to preview ad materials. It shouldn't come as a surprise that 3Com would lean toward an agency using intranets since 3Com itself is banking so heavily on the technology.

In our cover story starting on page 17, 3Com speaks of the central role the corporate Web can play in keeping folks informed during and after a megamerger (in this case, 3Com's marriage to U.S. Robotics).

This reliance, of course, is not solely a 3Com phenomenon. Companies across vertical markets are discovering how intranets keep information flowing during the typically turbulent times associated with bringing together disparate businesses.

It is just this type of application that helps move a new technology from the rhetoric stage into the implementation stage. Only a few developments make that next leap into the lexicon of business, but it would appear that intranets have more than proved their mettle.

— *Beth Schultz*, executive editor
(bschultz@nww.com)

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Are all IP services supported out-of-the-box including complex multimedia applications such as CoolTalk and NetMeeting and mission-critical applications such as Oracle and Notes? Can custom corporate applications be supported without re-engineering?	☑
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WEEK

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Surfing for Saabs

Java-based legacy integration tool drives dealer extranet.



Saab Cars USA, Inc.'s 245 North American dealerships soon will be able to browse across an extranet to find the makes, models and colors their customers want.

Saab's Intranet Retail Information System (IRIS) extranet site, which will run on a Lotus Domino Web server, will link the dealerships and service centers to inventory databases running on IBM AS/400 and mainframe computers. Jacada, a Java-based legacy integration tool from Client/Server Technology, Inc. (CST), of Atlanta, generates the HTML screens from mainframe data.

"Being able to check inventory at different locations from any machine with a browser is a great improvement," says Markus Harry, a sales representative with B&B Saab, a Santa Clara, Calif., dealership that serves Silicon Valley. It definitely beats the current 286-based dial-up, poorly organized system, he adds.

Saab will rev up IRIS in April, when the Norcross, Ga., carmaker unveils its 1999 models.

Meanwhile, another vehicle maker, Caterpillar, Inc., of Peoria, Ill., also has driven into CST's camp. It, too, has licensed Jacada so it can provide dealers browser access to AS/400s.

Vaunting VRML

Intranet content developers on the edge of three-dimensional design techniques last month got a boost when the International Standards Organization made the Virtual Reality Modeling Language (VRML) 2.0 specification a standard. VRML can be used on a corporate Web for everything from visualization of building layouts to representation of complex data, such as pricing models.

Veer off to NW Fusion for more information on VRML.
6004
www.nwfusion.com

Netiva Web tool to ease tax collection burden

Santa Clara County plans intranet-based tax inquiry applications.

California taxpayers living in Santa Clara County might not like the tax bills they got this year any better than they used to. But if they've got a problem with their bills, they'll probably like the service they receive a whole lot better.

That's because the county's tax collection department is providing employees browser-based access to property records. For years, these workers had to burrow through microfiche reports to find information that will now be available to them via an intranet.

The employees will be able to search for records based on the property ID number — the only search term available on microfiche — the property owner, the address of the property or the property owner, or the owner's Social Security Number. The time spent on individual inquiries will be cut in half, says Jim Rusnak, who was the project manager.

In preparation, Rusnak worked with the county's data processing department to extract data from master files and build relational databases using Sybase, Inc. SQL servers. He then partnered with Netiva Software, Inc., of Campbell, Calif., to develop the Web application that would interact, via Microsoft Corp.'s Open Database Connectivity, with the database.



This was the first instance of the Netiva software interfacing with a large database — the county maintains approximately 650,000 property records, Rusnak says. As such, he adds, developers ran into some technical difficulties but none that were insurmountable.

And now things promise to get a bit less grueling for those dealing with the Santa Clara County tax collection department.

VW bug gets chatty

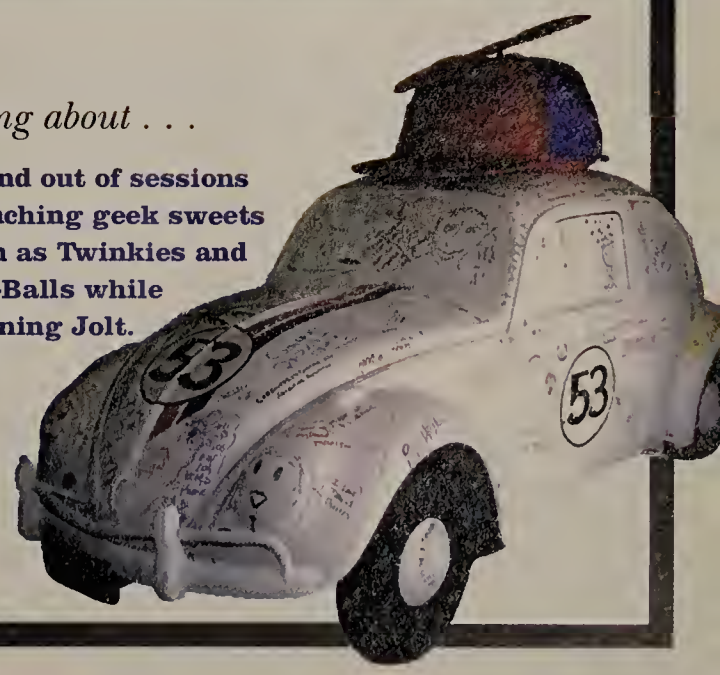
In case you're wondering about the genesis of that hot new intranet gadget you've been reading about . . .

The folks who bring you the latest technological toys are known for working hard. But as witnessed at the recent Internet Showcase produced by industry pundit David Coursey, they're also known for playing hard.

Although only a Coursey-chosen cast of companies were given stage time to demo their latest Web wares at the San Diego gathering, everyone could have a say, and a bit of fun, by tagging a whitewashed VW.

Some participants, such as Bob Frankston and Dan Bricklin, were old hands in new roles. More than a decade ago, these two designed VisiCalc, the earliest electronic spreadsheet. Today, Frankston is in research and development at Microsoft Corp. and Bricklin is crafting a nonlinear document format suited to Web pages for start-up Trellix Corp.

The "Love Bug" was covered with graffiti by the end of the three-day event, and attendees were sufficiently hyped — or perhaps hypered — up. During the week, they mingled in and out of sessions munching geek sweets such as Twinkies and Sno-Balls while downing Jolt.



NCs for your intranet

Network computers make cheap, easy-to-manage Web clients.

BY MARK GIBBS

Despite industry infighting over standards and developing market factions, the "little computers that can" — network computers (NC) — are slowly moving onto intranets.

To qualify as an NC, a device must conform to the Network Computer Reference Profile published last June by The Open Group. According to the profile, an NC must have a Java-based execution environment, support network-resident and stand-alone applications and be dependent on the network. IBM, Netscape Communications Corp., Oracle Corp. and Sun Microsystems, Inc. developed the profile, but The Open Group manages it.

You should be able to put an NC on a desk, plug it into the network, switch it on and walk away. Storage and computing power is centralized at the network server, making management fairly easy.

NC adoption has been rather slow, but users tend to be enthusiastic and satisfied. Such is the case at the California Housing Finance Agency (CHFA), says Dominick Maio, chief information officer.Staffers at the Sacramento-based agency, which makes loans to first-time home buyers, primarily use computers for word processing, spreadsheets and database applications. Since 1994, CHFA has been operating the equivalent of today's NC environment, Maio says.

That's because the agency has been using HMX X-Window terminals from Network Computing Devices, Inc. (NCD) with an X-Window version of WordPerfect. A year ago, CHFA added a Windows NT server to support

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Windows applications. It uses NCD's WinCenter software to deliver NT applications to the desktop devices. "We avoided one cycle of purchasing new desktop equipment," Maio says.

A growing field

A number of vendors besides NCD play in this market (see graphic). One of them is Network Computers, Inc. (NCI), an Oracle spinoff founded last year. It is aiming at corporate users with its NC Network in a Box and servers.

NCI's basic kit consists of a Toshiba Equium 5200D server, which has a 200-MHz Pentium processor with 64M bytes of dynamic random-access memory and a 2.5G-byte hard disk drive and three NC Client NCs (based on x86 PCs) complete with an Ethernet hub and 10Base-T cabling.

NCI's NC Cards, the hardware components of the authorization system, are novelties. A chip embedded in a card stores information about the user. Card users will not be granted network access if they do not have the correct user name and password.

Another player in the NC market is Corel Corp., which last October launched the Video Network Computer from its new NC company, Corel Computer Corp.

Based on the Digital Equipment Corp. StrongArm SA-110 microprocessor and 32M bytes of RAM, the device is oriented toward multimedia use. It offers composite high-resolution video output, video capture and compression/decompression for voice and videoconferencing, full stereo in/out, microphone and speaker, and support for analog and IP phone.

Corel's choice of operating system for the Video Network Computer is interesting and unique in the NC market: It uses Linux running a Linux-compatible Java Virtual Machine from SunSoft, Inc.

Of course, intranets aren't going to migrate to NC wholesale. There's still that pesky — and enormous — existing base of conventional PCs, 40% of which are estimated to be running DOS, according to a survey by Giga Information Group, Inc., of Santa Clara, Calif.

The Java connection

Sun's answer to this problem is JavaPC, a software package that will provide the same environment as Sun's JavaStation NC but will run on DOS. Sun expects to ship JavaPC this quarter for approximately $100.

JavaPC will be Java Developer's Kit 1.1.4-compliant, which means it will run the same Java applications that run on an Intel Corp. PC or a Unix workstation with Java support.

JavaPC only will require DOS, DOS device drivers and a network connection. It will come with a TCP/IP stack and the HotJava Web browser. It also will support Citrix Systems, Inc.'s Independent Computing Architecture protocol, allowing JavaPCs to act as terminals to a WinFrame server.

The product could be a tremendous way for Sun to soften up the market and make NC technology understood and acceptable to the corporate IT shops.

A SAMPLING OF NETWORK COMPUTERS

Aranex Bedford, Mass.	(800) 400-1254 www.aranex.com/ics	Internet Client Station	$ 525
Corel Computer Ottawa	(613) 788-6000 www.corelcomputer.com	Video Network Computer	Approximately $1,000
Boundless Technology Hauppauge, N.Y.	(800) 231-5445 www.boundless.com	Viewpoint TC 100 Viewpoint TC 200	$ 699 $799
IBM White Plains, N.Y.	(800) 426-4968 www.internet.ibm.com/computers/networkstation	Network Station Series 100 Network Station Series 300 Network Station Series 1000	$649 $799 $999
NCD Mountain View, Calif.	(650) 694-0650 www.ncd.com	Explora 400 Series Explora 700 Series	Starts at $695 Starts at $1,695
NCR Dayton, Ohio	(937) 445-5000 www.ncr.com	NCR TC 2990 Series	Not available
Neoware Systems King of Prussia, Pa.	(610) 277-8300 www.neoware.com	@workStation Supra-66 @workStation Prima NeoStation 540	$980 $850 $850
NCI Redwood Shores, Calif.	(650) 631-4600 www.nc.com	NC Network in a Box	Single NC, $739 Four-node system with server starts at $4,295
Sun Mountain View, Calif.	(650) 786-7737 www.sun.com	JavaStation NC JavaPC	$742 $100
Tektronix Wilsonville, Ore.	(800) 835-9433 www.tektronix.com	Tektronix NC200 Series	$895
Wyse San Jose, Calif	(800) 438-9973 www.wyse.com	Winterm 2510SE Winterm 2710SE	$1,189 $1,413

Oracle Corp. CEO Larry Ellison gave birth to his vision of a low-cost, zero-maintenance network that's around the NC camp.

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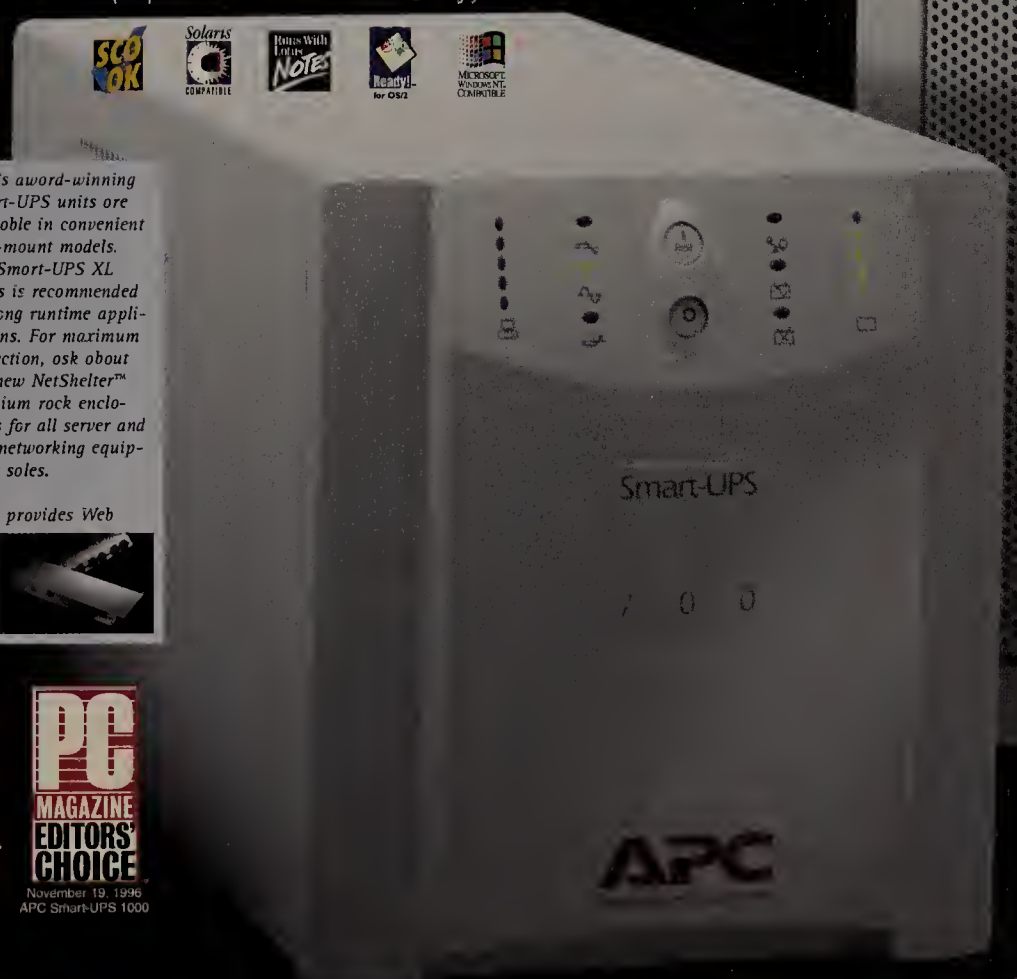
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Open Profiling Standard: At home on intranets

BY MARK GIBBS

You might not think there's reason to care about the demographics of your intranet users — or at least as much of a reason as out on the 'Net, where knowing a visitor's gender, age and other attributes can lead to targeted sales.

But demographic information on intranet users can be important, too. Try supporting customized content for business customers entering your intranet — you'll be clamoring for a standard way of identifying all those people.

Go online for more information on OPS, including:

- **A copy of the OPS proposal**
- **An OPS FAQ**
- **Details on the vCard standard**

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The Open Profiling Standard (OPS) proposal from Netscape Communications Corp., VeriSign, Inc. and Firefly, Inc. might be able to solve this identification issue. OPS' purpose is to provide a mechanism for controlled storage and retrieval of potentially sensitive information about the client on a client's computer by the client and servers. Moreover, OPS provides a standard structure for the information that allows for different levels of access.

By allowing the remote server to place information on the client, information about the user can be retrieved in subsequent sessions. This, for example, would allow an extranet user to reveal his name and address to a known, trusted server and allow the server to store the user's preference for that site.

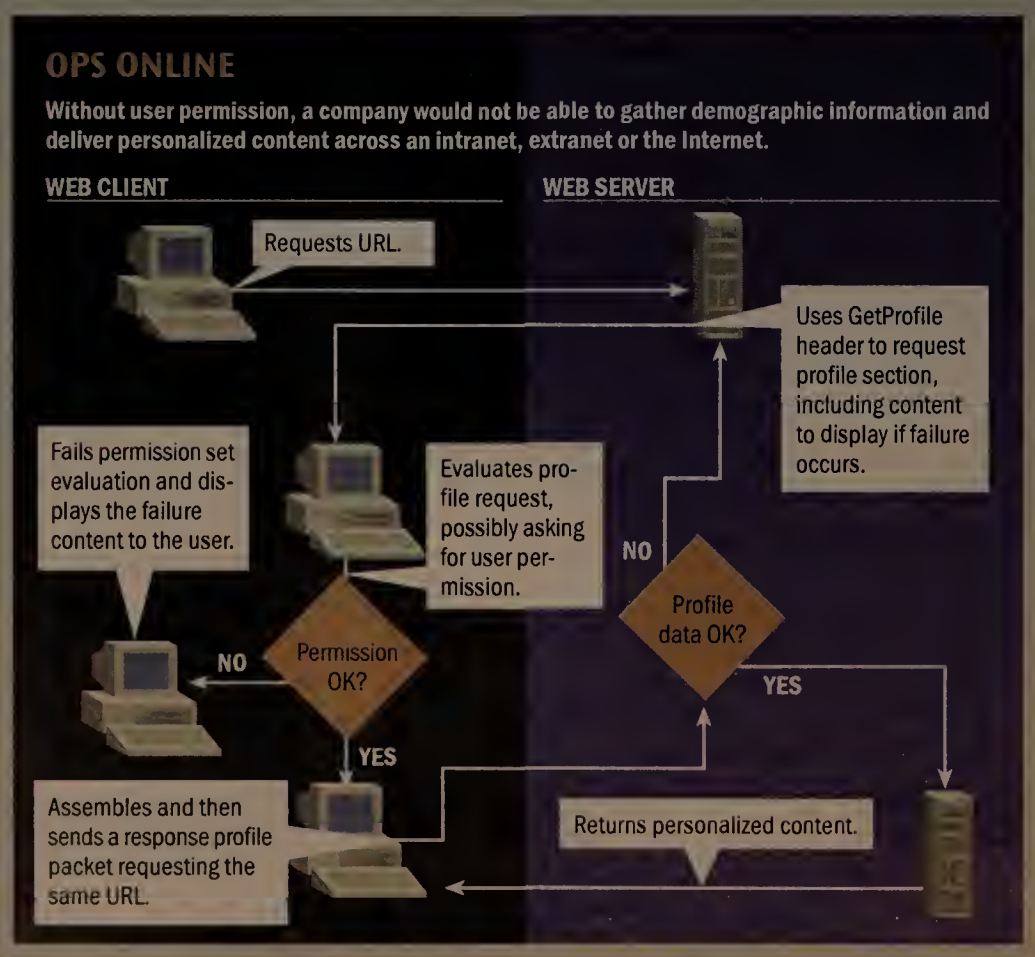
OPS meets three objectives: informed consent, value exchange and control by source. Informed consent requires that a party requesting an individual's information must have that person's consent. The individual must know what will be done with the information provided.

Value exchange ensures that no one can collect information without offering the information provider something in return. This means a person's profile is not freely taken without benefit to that individual.

Lastly, information access is to be controlled by its source. That is, whoever creates profile information should control the permission for dissemination.

For example, a company that allows customers to access an extranet-based product catalog would obtain informed consent to OPS data from its customers. This ensures that the customers know who will be using the data and for what purpose.

Value exchange could be implicit in a customer's interest in the catalog, or a company could quantify it by offering a discount on purchases in exchange for OPS data. Control by source ensures that customers can control what data is in their profiles.



Outward look

The OPS system is similar to the cookie mechanism in that it allows a remote server to place and retrieve data on an OPS-enabled client. The difference is the type of data it deals with and the controls on access.

OPS is based on digital certificates and the Internet Mail Consortium-managed vCard electronic business card specification.



ASK DR. INTRANET

Please step in and lie down, Steve Blass is in for consultations. He understands the strains felt by [illegible] oping and managing intranets. Send your problems to dr.intranet@paranet.com.

How can we prevent spammers from using our intranet's Simple Mail Transfer Protocol gateway, which is running sendmail, to propogate junk e-mail?

In the simplest case, the spammers are using your gateway as a smart relay host. Turning off the relay host functionality is a matter of editing your sendmail configuration file. Specifics depend on which version of the program you're running.

More sophisticated e-mail spamming is harder to stop. One method is to run an e-mail gateway inside the firewall for processing outbound mail sent from your domain and one gateway outside the firewall that will only accept and deliver mail destined for your internal domain. Configure the inside machine to accept only mail originating from the internal domain. In particular, the machine should deny SMTP connections from your external mail gateway to prevent spamming.

Unfortunately, there are still ways folks can generate spam that looks as if it has come from your domain. While encryption certificates and digital signatures can add security, the problem of keeping your domain name out of the "From: line" of junk e-mail sent by a dedicated anti-spammer is like trying to stop someone from writing your return address on a piece of mail and dropping it in a mailbox.

FrontPage follow-up

In my December 1997 column, I said security permissions are inherited from the root web and cannot be assigned independently for each child web when using Microsoft Corp.'s FrontPage.

But Pam Edwards, Web administrator at Wheat First Butcher Singer, Inc., of Richmond, Va., says: "An option under Tools, Permissions, lets you change the permission structure — you can choose 'Use same permissions as root web' or 'Use unique permissions for this web.' This option only appears when you have the child web open.

"By changing this option, you are allowed to set security permissions that are independent of the root web.

"It's a simple process that doesn't require additional ports or editing of files. And it works: No associate can edit another's child web, and no associate who is not a member of an authoring group can edit anything."

Blass is a network architect at Houston-based Sprint Paranet, a distributed computing systems services provider.

The OPS specification doesn't deal with how profile data is transferred, so HTTP or any protocol can be used for that job.

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Circle Reader Service #8

The OPS profile data is a hierarchical structure of named sections and subsections. These sections and subsections contain pairs of attributes and their values. For example, the section "demographics" might contain an attribute "age" with a value of "45."

There are three kinds of sections: well-known, permissions and transaction logs.

Well-known sections will define elements that are common to all OPS-compliant client and server applications. These sections will include anonymous demographic information, such as age, numeric identification information and contact information.

The permissions sections contain specifications of constraints which, when evaluated by the OPS-enabled client, allow or prevent access or modification of profile data. There are four sets of permissions for each attribute or section, corresponding to the two fundamental operations (read, write) and the two parties (end user, reader/writer).

For an operation to take place, the user and profile reader/writer permission sets must be satisfied. The details of fulfilled requests are recorded in the transaction log section. Transaction logs provide the ability to track access to profile data so readers can be held accountable for use of that information.

The client controls access to part or all of the profile, except when explicit permission has been set. In this case, the client confirms whenever any remote server reads from or writes to the OPS profile.

The access control specifies which remote systems can read and write data to which sections under what conditions.

A remote profile writer also can be granted access for modifying a section or sections' permissions. In such an instance, the profile writer becomes a section authority.

For example, when a user who has given consent accesses the Acme product catalog on an extranet, her choices are recorded in a section named acme.com. Once permitted and until the user revokes the privilege, acme.com is the section authority.

Two separate parties — the top-level section authority and the end user — create access policies for the read and write actions. This provides four sets of permission for each attribute.

Implementations typically will provide a management interface with the flow down of permissions from a section to its subsections.

Security

Technologies such as public-key cryptography, digital certificates and public certification services will be used to support OPS. End users and readers/writers will choose the level of security they consider appropriate for a particular transaction.

OPS specifies a means for end users to reliably verify the identity and practices of readers/writers using existing certificate methods and protocols.

But insecure profile exchanges — that is, those that don't use digital certificates — will be common on intranets. OPS specifies how the Domain Name System can be used to provide unreliable service identification.

Status

OPS developers submitted the Internet Draft in November 1997. More than 60 organizations have committed to support OPS. Among them are American Express Co., CommerceNet, Digital Equipment Corp., Hewlett-Packard Co., IBM, J. Walter Thompson and Sun Microsystems, Inc.

That said, most members of the OPS booster squad support the World Wide Web Consortium's (W3C) Platform for Privacy Preference Project (P3P). W3C is positioning OPS as part of P3P; it will not endorse OPS per se.

In light of this, it remains to be seen what happens with OPS. But one thing is for certain: OPS has been a great step forward in building a framework for handling private information.



WindDance's WebChallenger: A flawed, but useful management tool

BY MARK GIBBS

"It slices, it dices — but wait! There's more!"
— Ad for the Vegematic food processor

Using standard network management tools and utilities in the Web world has obvious drawbacks, such as the high cost of buying a half-dozen or more products and the lack of an integrated console. But there is hope: WindDance Networks Corp.'s WebChallenger.

WebChallenger is sort of a Web management Vegematic: It measures, it tests, analyzes, raises alarms and reports.

WebChallenger is a Windows NT service with an HTTP interface. It provides a range of diagnostic benchmarking tools, and with the distributed version, you can set up load-balancing and redirection services. All of this is in a product that is simple to install, makes intranet management easier and provides good value.

On the downside, WebChallenger displays a number of defects.

To begin with, WebChallenger's user interface needs some work. It requires use of a browser with Java and JavaScript support, raising issues of browser compatibility. In my tests, I couldn't access WebChallenger with Netscape Communications Corp.'s Communicator 4.02, but could with Version 4.03.

I also found that when you don't do things in an expected order, the product may produce obscure error messages. For example, if you tab from field to field in the user configuration form and tab over the server name field to get to the server pick list button, you'll see the error message: "Value is not conforming to the naming convention specified in RFC 1035."

This is fine if you happen to know that RFC 1035 is for the implementation and specification of domain names. The problem is, when you set the focus on the server field and tab to the next item, leaving the field blank, WebChallenger's JavaScript code checks the server field's value and decides that blank is unacceptable. That's even though the next item is the button to access the list from which you choose a server!

Another gripe is WebChallenger's screen layouts. They are just plain clumsy, diminishing usability. Part of the problem is WindDance uses primitive screen formatting.

An example of this is when you click on the "Save & Reload Data" option available in many sections. This opens a new browser window, but the window doesn't contain a button or link to take you back to the page you were at. This means you have to exit the window via the window controls.

More seriously, I have concerns about WebChallenger's reliability. The service crashed a couple of times with Windows NT access violations for no apparent reason.

Even so, I like this tool. Installation requires no more than 10 minutes. Then, upon reboot, WebChallenger launches as a Windows NT service.

You can install the product on the same machine as a Web server or on a different server. One copy can monitor and check multiple Web servers on the same network segment.

Installation requires 12M bytes or so of disk space, but data storage and statistics require 100M bytes or more, depending on how busy the servers are.

To configure the product, you use a Web browser to connect to the machine running WebChallenger via Socket 31119 instead of the usual HTTP Socket 80. The home screen informs you that Java and JavaScript must be enabled, tests and confirms that they are and displays your browser version.

WebChallenger's home screen and the first screen of every major section offers a description of that section.

Under "Configuration" in the Administration subsection, you can set up the administrative user's name and password and the e-mail and pager addresses for sending alarms. There also is an option to set up names, passwords and e-mail addresses of secondary users who can only access alarm and statistical functions for one server.

SCORECARD

Criteria	Rating
Overall score	**5.9**
Ease of use (30%)*	1.5
Intranet suitability (25%)	2
Stability (25%)	0.8
Installation (10%)	1
Documentation (10%)	0.6

* Individual category scores are based on a scale of 1-10. Percentages are the weight given each category in determining the total score.



WebChallenger tests and confirms that Java and JavaScript are enabled, and the home page displays the browser version in use.

PRODUCT CAPSULE

Product:	WebChallenger Version 97.5
Vendor:	WindDance, Ottawa, Ontario
Contact information:	(613) 728-1700 www.winddancenet.com
Price:	Standard version, $1,800 per server Distributed version, $2,200 per server
Pros:	Covers a wide range of intranet management functions; simple installation and configuration; browser interface allows access from anywhere on an intranet.
Cons:	Bugs and errors; poor user interface; some features are not really functional.

WebChallenger tools

All WebChallenger displays use HTML frames. The top frame is a menu bar for the main options, the left frame lists the options for each feature, and the large main frame displays and lets you enter data.

The main options are:

- Web Benchmark, to determine server performance.
- Web Alarm, to report on limits exceeded

We tested WebChallenger on a Micron Electronics, Inc. Vetix Lxi server with a 266-MHz Pentium Pro processor and 128M bytes of RAM.
In our tests, the server was running Microsoft Corp.'s Windows NT 4.0 and Internet Information Server 3.0 software on an Ethernet LAN.

and error conditions.

• Web Diagnosis, which captures TCP, User Datagram Protocol (UDP) and Internet Control Message Protocol packets for analysis.

• Web Explorer, to identify servers.

• Web Statistics, for clients' usage statistics.

• Web Verify, to detect broken resource links and orphan files.

If you purchase the distributed version, WebChallenger includes Web Director, which allows you to distribute and balance Web server traffic load across a number of servers.

Web Benchmark provides a load simulation that approximates the load of up to 120 users in a number of different tests. This is a useful facility for finding baseline performance.

WebAlarm monitors Web, File Transfer Protocol, Simple Mail Transfer Protocol, Network News Transfer Protocol and other services. You can set alarms for response, connection and throughput thresholds, and for servers not responding or listening.

Another bug I discovered was that WebChallenger refused to admit that my SMTP server was running. This prevented it from sending me an alarm saying that SMTP wasn't running.

Web Diagnosis is a packet-capture service that can display packet capture in real time or store it as an HTML report, as well as replay a packet-capture session. Here again, there are minor problems. The format of the real-time capture display is weird (it looks like a bug in the Java applet), and the replay is too fast to be of any use.

The HTML Web Diagnosis report is useful as long as you can decode the raw packet data displayed. Also, the lack of date- and time-stamping of packets limits the value of this feature.

Web Explorer does a competent job of identifying services on all the nodes in a given network range and produces a useful report. It can help you find out what's really running on your intranet.

Web Statistics monitors the segment on which WebChallenger is running and tracks a number of parameters for each server it is configured to watch. These parameters include the 200 most and least wanted pages, clients having errors, the 200 most active referrers and the 1,000 most active clients.

The only problem with this feature is only the pie chart for total number of accesses is displayed. The Java applet failed with an obscure error for the hourly, day-of-week, day-of-month and monthly options.

Web Verify is great. You can configure WebChallenger to explore any number of Web servers' content, either immediately or on a schedule that ranges from every half-day to once per month. Verification also can include checking external URLs, although this is of no use if external sites can't be accessed directly — WebChallenger doesn't support proxy servers.

When URL errors are found during background verification, notification is sent via e-mail or pager according to the configuration.

Finally, with the Distributed WebChallenger, the Web Director feature allows you to identify the domain of a client request and redirect it to a specific server. This is useful in extranets for redirecting requests. For example, say a client in Japan tries accessing your Asian Web site, you can redirect that request to your Japanese Web site for better performance.

But wait ...

WebChallenger is useful, despite the few minor and the couple of more major problems. When it comes to the range of management functions, WebChallenger certainly has that slicing, dicing quality. For large intranets, this tool will pay off its cost quickly.

If WindDance addresses the problems I've discussed, the next release of WebChallenger will be an indispensable management tool. Hey, it might even do crinkle-cut fries.



Circle Reader Service #3

Documenting progress

BY BETH SCHULTZ

In this, the first of an ongoing series revisiting intranets we've profiled, we take a second virtual tour through Xerox Corp. and its Web. Much has changed, but not enough to satisfy the core intranet team.

If the Xerox-Wide Web (XWW) is nothing else, it's a victim of its own success.

Since we last visited XWW in July 1996, the number of intranet users has doubled to more than 46,000, applications have become increasingly interactive, and the enterprise infrastructure has been fortified to handle the extra network load.

Intranet developers, it seems, have more than overcome the cultural hurdle that had loomed before them as they rolled out this new communications medium (*IntraNet*, July 1996, page 35). "We wanted to democratize information, and we've done that. We wanted to grow this into a place for Xerox people to go, to come into the office and check, and we've done that," says Cindy Casselman, who had been manager of strategic communications and intranet development until Feb.1, when she began an 18-month fast-track program with the head of advanced technology. Her work on XWW led to this opportunity, which is typically reserved for engineers.

Cindy Casselman and David Woodruff, XWW developers, take heart from the information management department's recent decision to create an Office of the Intranet. While Woodruff manages the office, he's still looking for corporate-level buy-in.

JOHN DOE

While accomplishing most early goals, the intranet team has failed to meet one of its chief objectives: to elevate responsibility and, perhaps more importantly, funding for XWW to a corporate, rather than departmental, level. The corporate communications department has been driving intranet development but does not have any real authority. "We have a major crying need right now for a formal steering committee," Casselman says.

While short of Casselman's ultimate desire, a recent change is a step in the right direction. The information management (IM) department just last month established an Office of the Intranet. After dismissing intranet application development for more than a year, the IM department now has embraced Web technology.

The office is run by intranet team member David Woodruff — actually, the Office of the Intranet and Woodruff are one and the same. "It's just me, at least until I come up with specific plans and deliverables," he says.

Woodruff will create guidelines, policies and procedures for intranet sites and will advise people on the technology and tools they'll need to do things on XWW. He also plans on building application cost models.

Until this move, intranet developers have been frustrated by IM's, as well as corporate management's, lack of commitment to XWW. The intranet team lost a big IT advocate when Malcolm Kirby, who had been an IM manager, left the company in July 1997. Casselman, Kirby and Richard Beach, a Xerox scientist, had envisioned and then set about building an internal Web well before the term "intranet" thrust itself upon corporate America.

It's not that Woodruff, who succeeded Kirby on the team, isn't a believer. It's just that his boss wasn't an ardent intranet backer, so the group lost its strong IT hook.

In 1997, 5.9 tera[illegible] around the Xerox-Wide [illegible]

"From a technological standpoint, a little more than a year ago IM considered the intranet a minor way people might communicate," Woodruff says.

Rather than rolling out Web-based applications or retrofitting legacy applications with browser access, IM devoted its energies to infrastructure-related issues. These efforts centered on users' needs to access and download information from the Internet.

"We changed our entire structure in terms of the way people get things from the outside world," Woodruff says. The company added more outside connections, pumped up bandwidth on some circuits, upgraded to higher speed routers, built a 100M bit/sec Ethernet "demilitarized zone" and installed firewalls. "Our network used to represent 50% of the latency of getting to a site outside. Now it represents only 1% of the delay," Woodruff says.

As important as fortifying the network has been, it came at the expense of XWW, the intranet team says.

But now, while IM continues building the infrastructure, it is embracing the Web. Its newfound commitment centers on the realization that a tremendous, but unspecified, amount of money will be saved with the intranet compared to its traditional client/server architecture, Woodruff says.

Establishment of an Office of the Intranet coincides with IT's big push to Web-enable everything in 1998, Woodruff says. He explains IM's vision as such: "By the millennium, if you don't turn on your e-mail and browser when you walk into your office, then we should take away your computer."

Woodruff says he doesn't expect Xerox employees to resist IM's new mandate. XWW is generating a lot of

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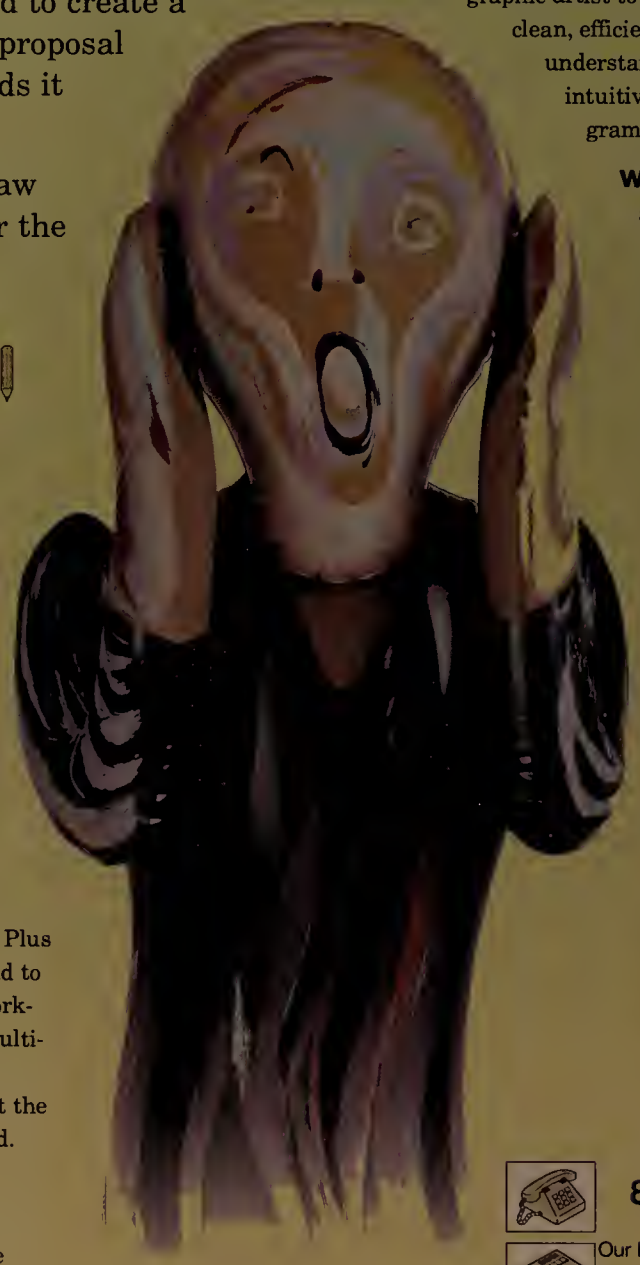
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XWW: THEN AND NOW

July 1996	January 1998
Accessible by 20,000 employees	Accessible by 50,000 of the 72,000 Xerox employees
250 Web servers	575 Web servers
1,000 sites	7,000 sites
Netscape's Navigator and NetManage's Web-Surfer browsers for Windows PCs and Spyglass' Mosaic for Unix machines	Microsoft's Internet Explorer for Windows and Navigator for Unix
Primarily running CERN Web server software	Microsoft's Internet Information Server for NT and Netscape's Enterprise Server for Unix
Characterized by workgroup-oriented publishing applications	Characterized by division-level collaborative applications
Downloads operating at 1K bit/sec throughput	Downloads operating at 72K bit/sec throughput
Considered minor means of communications	Considered critical business tool

excitement, he adds, citing as an example casual conversations he's had with fellow employees. "When I fly to Stamford, [Conn.], people on the van out to Xerox headquarters talk about what great things they've found on our Web — without knowing that I'm involved with it. All anyone used to talk about was the Knicks."

This may be attributable to the fact that XWW developers have shifted their focus from workgroup- to division-level applications. "We've gone from working with groups of 100 to 200 people to groups of 5,000 or so," Woodruff says.

Simultaneously, the status quo has moved from electronic publishing to collaborative communications, Woodruff says. The transition is simple and painless given that employees have ready access to DocuShare, Xerox's Web-enabled document management and group collaboration software.

IM, however, will need to increase its educational efforts and provide better stepping stones for groups heading toward the intranet. That's why creating an Office of the Intranet became an imperative, Woodruff says.

And, Woodruff emphasizes, XWW still needs the big executive-level buy-in. "Web-enabling everything is an IM vision; we're still pushing for a corporate champion."

Why will Woodruff keep trumpeting this cause? Because, he says, it's difficult getting funding for XWW-related projects despite the fact that the intranet has become an essential tool for most employees.

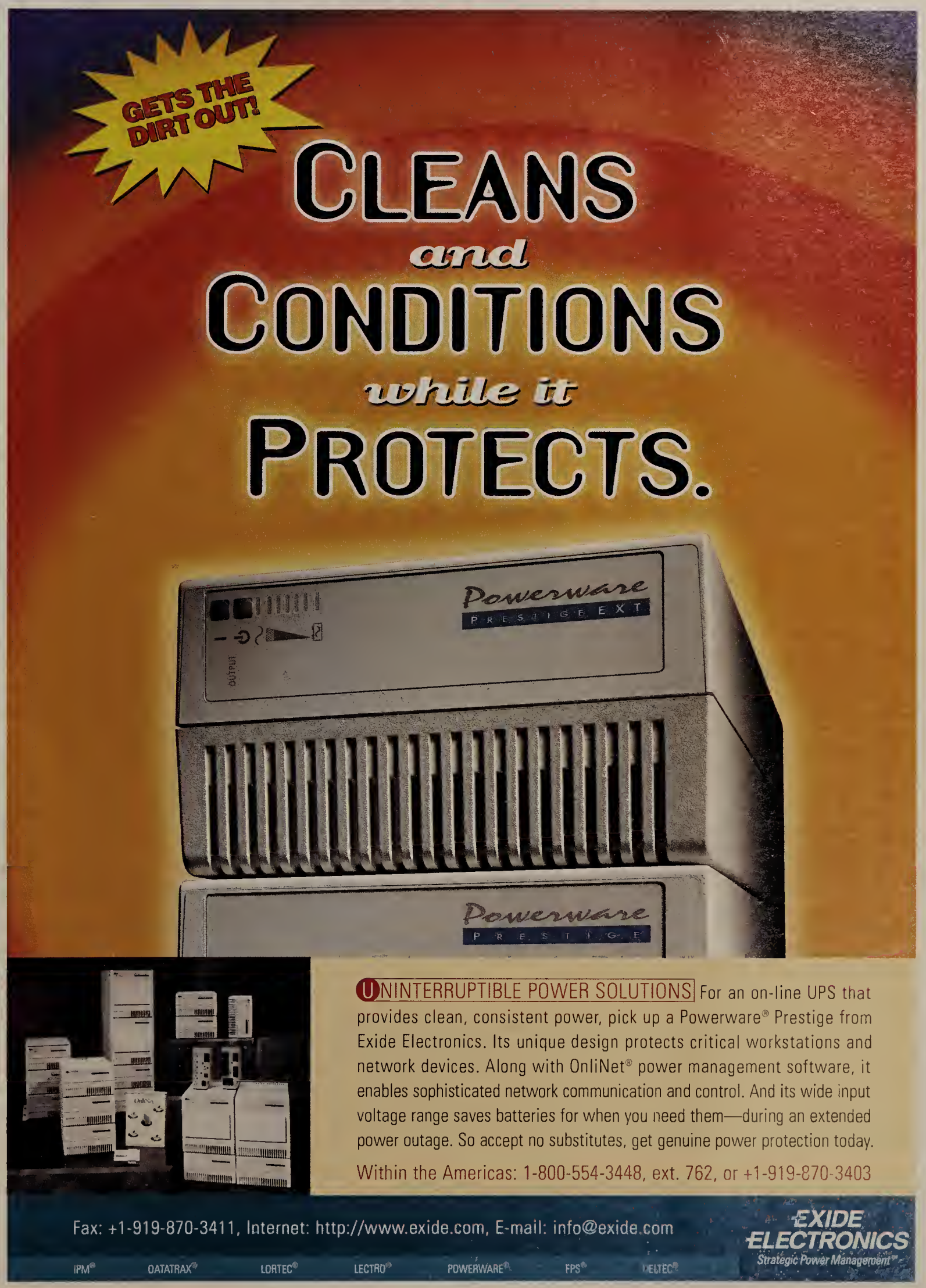
Intranet developers, naturally, would like XWW to become an indispensable tool for all employees. Although on average, high acceptance of the intranet is not consistent across divisions. "In some areas of Xerox, the intranet is both strategic and tactical, but in others, it's being completely ignored," Casselman explains.

A corporate mandate would go a long away in accomplishing this goal. Top executives see how useful the intranet is and how successful the team has been and they're satisfied. "But we know it could be used even more productively and powerfully if there was a centralized function providing some value," Casselman says.

And, when it comes to creating content at the divisional level, Woodruff says, oftentimes it's difficult justifying the expenditure. What's more, he adds, it's hard to deliver the infrastructure out to remote areas.

Despite continued frustration with getting the intranet effort elevated, Casselman has no doubt that one day intranet development will become a centralized function. Electronic commerce, she says, will force the issue.

"I believe that e-commerce is not just about interfacing with your customer and not just about the Internet — it has to have back-office support. So I think it's only a matter of time before people will say, 'Wow! Look at all the things we need to do in the back office, on the intranet!' "



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Circle Reader Service #6

Picking a Publishing Package

BY MARK GIBBS

Follow these five guidelines to ease the tricky task of choosing a Web authoring/ publishing tool.



ANTHONY FREDA

1 Allow for multiple authoring tools.

Web authoring tools offer WYSIWYG and tag editing. While WYSIWYG editing tools approximate how the document will appear in a browser, tag editing provides direct access to HTML code.

Allowing departmental users to manipulate HTML code is generally pointless since even the simplest Web page is complex at the tag level. Given this, there's a good chance the general user population will make mistakes when writing HTML code and waste time on endless minor adjustments.

What's more, you don't want to scare off users. Editing or even just seeing raw HTML is enough to persuade most people not to become intranet publishers.

So pick a WYSIWYG authoring tool for your general user base and a tag editor for more sophisticated users capable of dealing with the HTML code. Any word processor with an HTML export function, such as Word for Windows or Corel WordPerfect, makes operational and financial sense for WYSIWYG editing. If you don't have such a word processor, check out Elemental Software's DrumBeat, the only purely WYSIWYG product; NetObjects, Inc.'s NetObjects Fusion, an outstanding WYSIWYG tool that also allows access to the underlying HTML code; and Microsoft Corp.'s FrontPage 98.

2 Pick a tool that helps users visualize and analyze content.

During the past year, about half of the vendors in the authoring tools market added features that allow the creation and exploration of "maps" of Web content. These maps range from simple inverted trees showing which pages link to which other pages to linkage diagrams that can be rotated and manipulated to provide more detailed views.

Even more important than these visualization capabilities are the new analysis features that these latest wares offer. The features allow users to find broken links to content, determine whether the target content exists and identify missing images and other page elements.

FrontPage 98 and NetObjects Fusion are among the products that offer mapping, link validation and management features, and SoftQuad, Inc.'s HoTMetaL Pro has a powerful visualization feature.

3 Look for tools that support templates and wizards.

Many packages, such as NetObjects Fusion and FrontPage 98, now offer a template facility or wizards that make creating and enforcing document layout and format standards easy. Templates are fixed prototypes that have no conditional architecture. Wizards, on the other hand, ask questions and assemble Web pages based on a user's responses.

4 Look for publishing tools that support multiple users and have or can integrate with a version control system.

Support for multiple users becomes imperative as workgroups get more ambitious and their publishing needs become more complex. And when multiple users are involved, the authoring tool has to offer access controls so only authorized users can modify content.

In addition, authors need to be able to check out a document and modify it while it's under their control. They also need a version control system that ensures that different iterations of the document can be retrieved as needed.

A few vendors have integrated version control packages with their authoring tools. For example, Microsoft has integrated its version control software, called Visual SourceSafe, in FrontPage 98. FrontPage 98 also offers author control and document checkout, as does NetObjects Fusion.

5 Consider building your own authoring tool.

This might sound daunting, but homegrown packages might fit the bill nicely in a number of environments. I'm not advocating developing a full-fledged editor, but rather building simple forms that are consistent with other data entry tasks and that generate HTML documents as output. Building your own tool might prove more cost-effective than bringing in a commercial product and having to train a large number of staff in the ins and outs of it.

To do so, you could modify a much-used existing package, such as Microsoft's Word for Windows. You might build a Word macro, for example, that prompts for data input to fill templates that are saved as HTML documents.

Or, you could use a basic application such as Visual Basic to create a simple catalog that doesn't warrant a custom database on the server. This would allow users to create and modify highly structured catalog pages without errors. Such a program would simply fill fixed fields in a template with validated user input and export formatted HTML documents. Using a development tool kit with VBX or ActiveX components, you could extend the program so it uploads and downloads Web pages via the File Transfer Protocol.

Along this line, Catalyst Development Corp. offers Visual Basic with Catalyst SocketTools, which includes VBX and 16- and 32-bit ActiveX versions.

Go online to find more information about Web authoring tools, including those mentioned in this article. www.nwfusion.com 6002

Doin' the merger mambo



MARC YANKUS

BY PEGGY WATT

In the dance that occurs when companies merge, good communication helps the new partners step to the rhythm. And intranets can help amplify the tune.

When Knight-Ridder Information, Inc. (KRI), a company whose very business is communications, faced acquisition last summer, IT staffers immediately put a merger and acquisition information page on the corporate intranet.

A Java applet scanned KRI's voluminous news resources for mention of the company's sale and posted any findings. Management posted memos and maintained a frequently asked questions list. When the British information services company M.A.I.D. plc became the successful suitor, IT added links to the new parent's World Wide Web site and a live feed of its stock ticker, according to Marck Shipley, vice president of information technology for the merged firm, which is now called The Dialog Corp., in Mountain View, Calif.

KRI's experience is a typical and successful example of how a company with a mature intranet can use the communications power of its internal Web to reassure employees during a usually unsettling time. Eric Benhamou, a master merger of network companies, would not have done it differently.

A merger creates enormous uncertainty among employees, even if it's accompanied by excitement and anticipation. Worse, management has limited time to appease nervous employees, says Benhamou, chairman and CEO of 3Com Corp., which relied extensively on its intranet while integrating its latest acquisition, U.S. Robotics, last June.

"One key reason mergers and acquisitions often falter is the failure by management to distribute a consistent message across locations in a timely fashion," Benhamou says. "Employees are typically willing to stay in limbo for a little while. But if that state prolongs itself, they will check out. Intranets provide a way to very quickly and often interactively communicate across the entire entity."

At 3Com, management posted frequent status reports, took questions and conducted open, online forums on 3Community, the then two-year-old intranet. The policy of a steady flow of information apparently was effective; most employees stuck around for the new adventure, to Benhamou's relief.

In addition to using 3Community internally, 3Com built an extranet for the two companies' management teams to use when making plans and exchanging information. The Securities and Exchange Commission permits joint business planning activities prior to legal merging of assets, so the prospective partners started coordinating their shared business. They assigned cross-departmental teams to tackle issues from manufacturing to combining financial systems and human resources. They pooled ideas, posted meeting agendas and planned the postmerger procedures.

"These teams were composed of people who were literally all over the globe," Benhamou says. "We used a temporary extranet with a firewall and password access. It became the basis for the new intranet launched the day the companies merged."

Prepare to dance

Some Web consultants even recommend sketching out the steps for using an intranet long before the merger music starts.

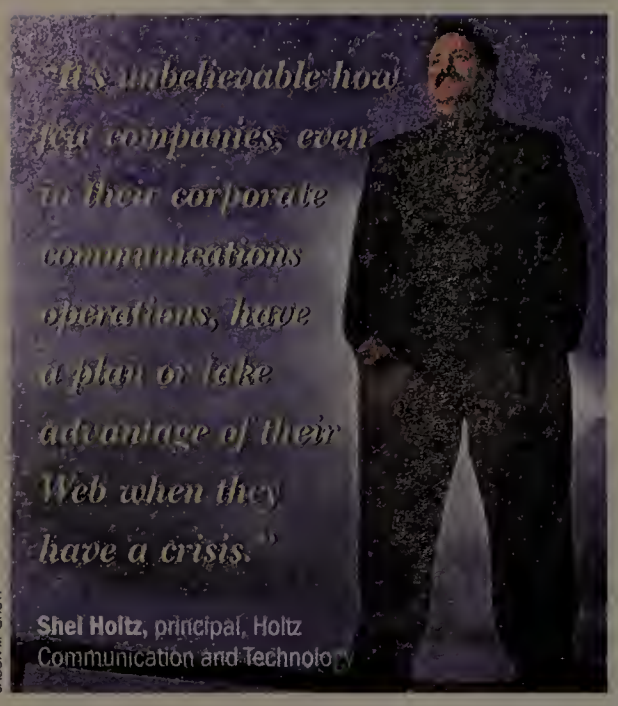
Mergers and acquisitions happen, so a savvy intranet team ought to have a place-holder plan, even a dummy Web page, as a starting point that can be customized when the time comes, says Shel Holtz, principal of the consulting firm Holtz Communication and Technology, in Concord, Calif. Processes for disseminating information, such as online conference facilities and a way for employees to anonymously submit questions, can be designed in advance.

Consultants for KPMG Peat Marwick LLP, in New York, advise clients to consider the intranet's crisis communications role when crafting the business case for building a corporate Web.

"We suggest that one significant benefit is that as the company proceeds with future mergers and acquisitions, the technology actually facilitates bringing together many different systems," says Robin Palmer, partner in charge of electronic commerce at KPMG. He is experiencing his own advice; KPMG Peat Marwick is winding its way through the legal process required to merge with Ernst & Young LLP.

Technologically and content wise, a corporate Web can act as an effective bridge for new partners, Palmer says. His consultants usually recommend that clients implement a standards-based component-oriented intranet architecture. When firms merge, they can more easily join their technology if they have stan-

Intranets help companies synchronize their steps and help employees get into the beat after a merger or acquisition.



JASON M. GROW

dard modules that can interact. The more browser-accessible the information, such as legacy data, the more easily users can be added.

One client that didn't follow this practice came to KPMG Peat Marwick for help after several mergers, when it was coping with nine distinct e-mail systems, Palmer says. His team urged the firm to permit diverse e-mail in departments as long as they supported the Internet's Simple Mail Transfer Protocol for bridging among them.

Taking lessons

Even in the short history of intranet technology, a few companies have circled this particular dance floor several times, and they're picking up creative moves with each round.

Corporate Express, Inc., of Broomfield, Colo., for example, actually built its extensive intranet and extranet with acquisitions in mind. Acquisitions are a central business strategy of the office supply giant, which has bought more than 200 companies in the past four years.

An IT project from the start, Corporate Express' intranet is meant to be scaleable. "We developed an intranet infrastructure that could accommodate any number of acquisitions of any size business," says Jennifer Maher, director of new media.

Last year, the company assembled a transition team of about a dozen senior managers to build a standard acquisitions strategy that included intranet use. In fact, the team currently meets and reports on activities using an intranet-based conferencing facility, says Mike Meranda, global brand integration manager at Corporate Express.

The transition team wrote a checklist of procedures for any acquisition and assembled a list of standard resources available on the intranet. For example, a document about the Corporate Express brand offers everything from graphics files to policies on color and placement, as well as guidance on when and how to legally adopt the new name. The IS department prepared a questionnaire to take inventory of an acquisition's assets and determine equipment needs.

Despite Corporate Express' degree of experience in managing acquisitions, building a transition team that relies on online resources has smoothed the process, Meranda says. "We know the integration strategy quickly and we can conduct business with the new company more efficiently," he says.

Rweb, the intranet of Rockwell International Corp., of Costa Mesa, Calif., has played an increasingly important role in a series of transitions. In the past two years, Rockwell International has sold its defense and aerospace divisions, divested its graphics systems business, spun off its automotive division and boosted its avionics and communications group by acquiring part of Hughes Electronics Corp.

"It's been a fast and furious couple of years," understates Scott Nelson, Rockwell International's manager of internal communications. "We made a concerted effort to use our intranet to keep our employees abreast of the latest developments in our transformation."

Initially, management posted and printed memos and reference materials simultaneously. But in the past year, Rweb has become a primary information source for Rockwell International's transitions, Nelson says. It has been especially helpful for international employees, who receive electronic dispatches much more quickly than via mail, he adds.

IT staffs at other aerospace firms are

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DAVID POWERS

flexing their mouse fingers for another merger. Lockheed Martin Corp. and Northrop Grumman Corp. have been through the process before, with varying degrees of Web assistance. Their merger, announced last August, awaits Justice Department approval.

"I hope to connect our intranets quickly. That's when the real exchange of information can occur," says Bill Buonanni, Lockheed Martin's program manager of World Wide Web initiatives and director of WebServe, the organization that supports the intranet. Lockheed Martin, of Bethesda, Md., was created by the 1995 merger of Lockheed Missiles & Space Co. and Martin Marietta Corp. It later acquired Loral Corp.

The intranet has become more valuable with every merger, Buonanni says.

"To print policies and procedures and send them out to every new employee after every merger is expensive, and a task we wouldn't be able to do quickly without this infrastructure," he says.

Lockheed Martin also has gained a better understanding of Web capabilities since the last merger, says Art McAnarney, senior staff systems integrator. "We didn't have a clue how beneficial the internal internet would be to us for disseminating information to employees."

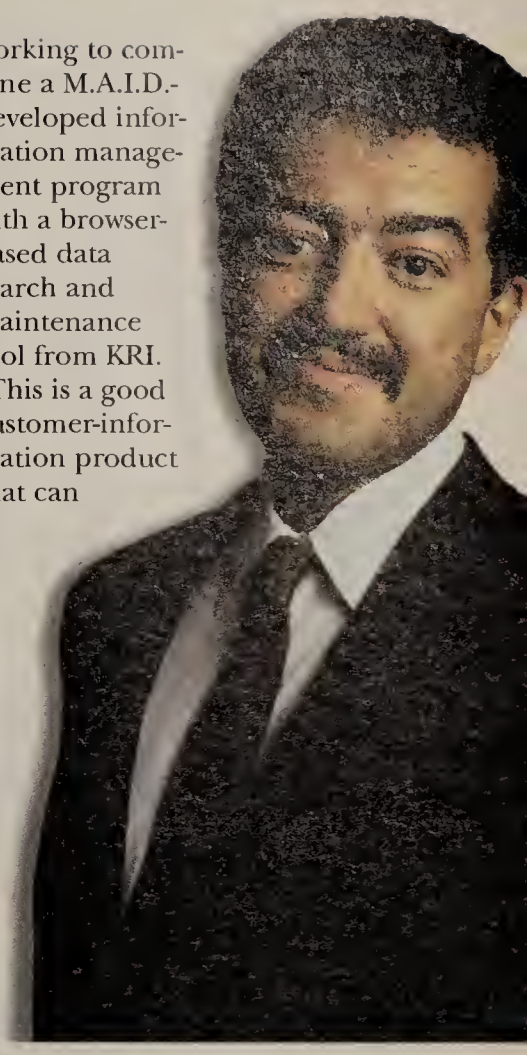
With this lesson learned, the intranet team is adding sites intended to be useful after a merger, Buonanni says. For example, WebServe has several new collaborative information sites on which managers can post ideas or proposals and respond to other inquiries. "It encourages interaction," he says.

Filling the dance card

Once the lawyers have shaken hands, regulatory agents have given their nod and the transition team has moved on to the next dance, employees still have to learn to synchronize their moves. Intranets help them get in line, too.

"Intranets enable you to tap into the intellectual capital you have out there and find synergy between employees who might otherwise not even meet," Holtz says.

KRI's Shipley points excitedly to a staggeringly large bank of resources available at Dialog, resulting from the merged assets of the two business information suppliers. IT teams are working to combine a M.A.I.D.-developed information management program with a browser-based data search and maintenance tool from KRI. "This is a good customer-information product that can



3Com Corp. CEO Eric Benhamou, known for his aggressive acquisition strategy, says sharing information on an intranet and extranet can smooth the merger process.

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draw on the combined repository we have. We want to show what's good about this marriage," Shipley says.

He also is counting on the intranet to help the new company's far-flung employees work together.

"We have large operations in many locations around the world, so the intranet is going to be key to helping people find who to call for information in our new firm," Shipley says. A priority is building a comprehensive online employee directory.

In KRI's case, employees already had learned to turn to the intranet for resources on the job and about their employment. Firms that have not made that transition find they take a giant step toward it when they merge with such a company (and its intranet).

Rockwell International's intranet was strengthened by its communications role during the company's series of transitions. "It really put Rweb on the map in regard to employee communications and established its credibility as a real-time information medium," Nelson says.

Even an entrenched intranet such as Silicon Graphics, Inc.'s Silicon Junction changed as a result of a merger. The acquisition of Minneapolis-based Cray Research, Inc. taught Sun employees to be less Mountain View-centric, says Kim Daus, a senior communications strategist at Silicon Graphics. Still, SGI literally forced former Cray employees onto Silicon Junction by requiring them to register for personnel benefits online.

"We called it tough love," Daus says. "Our goal was to integrate the internal Web into the way employees do their jobs. Silicon Junction is a big part of our culture, and Cray didn't have that."

SGI allowed some transition, however. Cray employees were e-mail oriented, so the employee communications staff sent memos by e-mail as well as posting them on the Web. An online tutorial trains all new employees on how to find information and resources on Silicon Junction.

Progress is slow but steady. "We see huge spikes of access across all locations when events or news accounts go up online," Daus says.

Fancy moves

Some clever maneuvers help lure newcomers to a Web culture and lead them to electronically bond with their new coworkers.

For example, months before The Boeing Co. merged with McDonnell Douglas Corp., Boeing's Webmaster urged departmental intranet page designers to link to a central graphics library whenever they used the corporate logo on their pages, rather than embedding the graphic on each page. The day of the merger, network administrators changed the centrally stored graphics to the new, merged company logo, and the revised design rippled through the intranet, instantly affirming the new identity.

Both firms had intranets, so the merged IT team combined their strengths, says David Weitz, manager of communication for Boeing's Web support team. Boeing's home page, called inside.boeing, provides a strong hierarchical index with many links and references. McDonnell Douglas contributed its storehouse of information on user habits and storage structure.

"If people need information, personal or business resources, they can go to inside.boeing to find out what is available and where to look," Weitz says. One of the first pieces of information a user enters is location, and then the server generates different pages as the user drills down through the options. The IT staff added links to McDonnell Douglas sites.

Meritor Automotive, Inc., which spun off from Rockwell International in October 1997, maintained a Web page called Next Steps to apprise employees of the spin-off's status. Its intranet, which was developing as a component of Rweb, sprung full-grown and was renamed InsideAuto with the birth of the independent firm.

"We really used the intranet to promote bonding among our employees," says Laura Bochenek, manager of employee communications at Meritor, in Troy, Mich. The employee communications staff posted photos from many of the new company's 46 facilities around the world, showing employees celebrating simultaneously when Meritor opened its doors.

Corporate Express promotes awareness of colleagues around the globe (especially new family members) by spotlighting one site every month on its intranet home page. The honoree provides an online scrapbook of information about its employees, their work, their community service activities and corporate social events.

SGI has pointedly featured news about former Cray sites, employee activities and personnel on its Silicon Junction home page to help bring the firm into the fold, Daus says. Silicon Junction prominently displayed a tribute to Seymour Cray upon his death a short time after the merger, for example.

Waltzing along

Even firms that have successfully merged with the help of electronic tools acknowledge a cultural challenge.

"It's almost easier if one company has an intranet and the other doesn't, because then you can introduce the employees of one company to the intranet of the other," Holtz says. "But then there's the challenge of making it *our* intranet instead of *their* intranet."

The larger the firms, the bigger the challenge, KPMG's Palmer observes. "Sometimes people have emotional investments in the tools and equipment they've chosen. It can be problematic." This is another reason he advises clients to pick standards and build scaleable systems.

Probably fewer than 5% of Corporate Express' acquisitions have intranets, but those that have a large IT staff are immediately brought into the IS council, which includes the chief information officers at every major business unit or site, Maher says. "This goes a long way toward integrating the IS departments of acquired companies."

Endorsements from management help promote intranet communications any time, but are especially effective with mergers.

"Management has been a strong proponent of the intranet from the start," Meritor's Bochenek says. Since the spin-off, she has obtained staff and funding to expand and redesign InsideAuto.

"It includes more information, not just company background and launch information, but more on employee services, career development and human resources," Bochenek says. And the larger it grows, the more active it becomes, she notes; every day, more employees are joining those on the online dance.

DANCING LESSONS

Intranet managers whose companies have been through the merger mambo have this advice:

1. Even if your company isn't engaged in such activity, have a what-if plan.
2. Create a "Mergers FAQ" Web site
3. Make corporate executives available online for questions.
4. Post reports from internal and external sources.
5. Give employees acquired through a merger intranet access quickly

INTRANETS ON THE MERGE

A few big intranets are about to get even bigger.



More than half of the Big Six accounting firms are facing mergers: KPMG Peat Marwick LLP with Ernst & Young LLP and Coopers & Lybrand LLP with Price Waterhouse LLP. All have formidable intranets, and information-sharing is an integral part of the corporate cultures.

Although prohibited by legal protocol from commenting much on their status and plans, representatives of the firms indicate that they are using their internal Webs to communicate the merger status with employees. They also eagerly anticipate the wealth of resources that will be available in a merged firm.

"Certainly the use of technology fundamentally improves the ability to communicate with thousands of employees," says Tim Pearson, chief marketing officer with KPMG Peat Marwick, in New York. "My expectation is that our combined new firm will be on the leading edge of [Web-based] knowledge management," Pearson says.

However, joining this dance is not a matter of just gliding into place. Although all of the firms have widespread browser use and active intranets, they are still coping with their own legacy integration issues. Many departments maintain another information management format, such as Lotus Notes, in addition to the Web.

Observed an IT manager participating in the Coopers & Lybrand/ Price Waterhouse merger: "We're trying to get stuff in line and trying not to be competitive. They're going to be our colleagues soon."

Likewise, MCI Communications Corp. and WorldCom, Inc. are cautious about commenting on their pending merger, although both have extensive intranets that help with employee communications and are planning their technological merger.

Representatives said they expect to increasingly use their intranets for employee communications as their merger plans proceed. However, still stinging from its failed merger with British Telecommunications plc, MCI in particular is reluctant to discuss details.

Another high-tech pairing, Digital Equipment Corp. and Compaq Computer Corp., also promises to be a Webbed wedding. Both companies have intranets, with Digital's being one of oldest and largest in the business.

— Peggy Watt

COLLABORATIVE catchall

BY DAWNE SHAND

Intranets are migrating from document libraries to platforms for collaborative applications, and that means new challenges for IT managers.



DAVID MCLIMANS

So much for your company intranet serving as a simple document repository. If it hasn't already, it'll soon be tackling bigger and better things, such as a collaborative teamwork.

Talk of bringing collaborative applications into the enterprise is far from new. It's just that intranets elevate such discussion to a higher level.

That's because intranets can foster truly participatory environments that provide business users access to all the information they need to do their jobs, as well as access to each other. It doesn't matter if the collaboration is unstructured, allowing people from different functional areas to share ideas; voluntary, encouraging employees to contribute their thoughts to affinity groups; or targeted, facilitating communications among geographically dispersed team members. Intranets can handle it.

New products, complete with interactive features such as those typical of Internet-based newsgroups or America Online chat rooms, make the intranet increasingly capable of meeting the wide variety of collaborative needs within a corporation. The products allow you to bring shared observations, discussion forums, chat capabilities, conferencing and team workspaces onto an intranet.

Collaborative packaging

Vendors are packaging these five basic collaborative techniques as separate tools or integrating them into business-focused applications. Here's a breakdown of each type of collaborative capability.

Shared observations

Because an intranet can potentially reach so many users inside and outside the company, adding features that structure a dialogue between different groups is a powerful means of soliciting input. Hewlett-Packard Co., for example, used this collaborative function to revamp how sales and marketing folks relayed information to each other.

Through its Electronic Sales Partner (ESP) program, HP provides salespeople with a structured template to fill out on the quality of each marketing piece. With this

feedback, product marketing can continually improve its work based on inputs from the field, says Steve Baker, who manages ESP for HP, in Cupertino, Calif.

"Before, if salespeople had comments on marketing collateral, they would have no idea how to route that information among 700 marketing people," Baker notes.



SHAWN HENRY

Adding a shared observation feature often requires that a company define new business processes to support these interactions.

Such was the case at one large telecommunications company when it decided to bolster a sales-support intranet with information on competitors' claims and counterclaims. The application required processes for routing inputs to a newly defined specialist who would be responsible for analyzing the information and distributing alerts to field sales. The development of this collaborative intranet forced the company to think through the source, routing, validation and distribution of what is simply an e-mail-enabled form.

Discussion databases

In a joint survey with *Network World* (see sidebar), we found that discussion databases are fairly popular on intranets. Twenty percent of survey participants said they make significant use of discussion databases on their intranet, while 42% indicate that they make limited use of the feature.

Discussion databases let people contribute thoughts on a particular topic at any time and from any place. Within a discussion database, the topic, subtopics and user responses each have headings and the dialogue is structured as an outline of different headings. Users then can drill down into the responses of particular interest or search across the database.

Buckman Laboratories International, Inc., a specialty chemicals firm in Memphis, Tenn., identified discussion databases as a way to improve customer service. Its idea was to form communities of experts dedicated to finding innovative solutions to customer problems.

At any time, a Buckman Laboratories employee can post a question to a discussion database on an intranet, called K'Netix, and get a response from anyone within the organization, including President Bob Buckman. One person converts discussion threads into documented solutions.

Unfortunately, well-managed discussion forums, as at Buckman Laboratories, tend to be an exception. It is easy to let discussions continue without ever coming to consensus or drawing a conclusion. Rarely is anyone assigned the task of culling through and synthesizing comments. The value of this feature declines if users see that nothing comes to fruition from their inputs.

Rather than assigning a person to handle the threading task as Buckman Laboratories did, you can use niche discussion database products, such as Soft Bicycle Co.'s Consensus @nyWare, and team workspace applications that merge survey and decision-support features within discussion databases. These products allow users to review everyone's comments and then cast an informed vote.

Chat

Chat allows users to exchange text messages almost instantly, simulating dialogue that happens during face-to-face meetings. This feature, based on the open Internet Relay Chat protocol, also is known as "instant messaging."

In our survey, 53% of intranet managers said they plan to implement some degree of chat functionality. Most companies bring chat onto their intranets so virtual teams can meet.

Management consulting firm Booz Allen & Hamilton, Inc., for example, uses chat to bring together experts discussing emerging topics of interest to clients. The Financial Service Corp., which provides services to a network of 1,400 independent financial consultants throughout the U.S., is experimenting with chat to document meeting proceedings for legal purposes.

One drawback to using chat on an intranet has been that these online events have had to be scheduled in advance. AOL-like, spur-of-the-moment chats weren't possible, as there was no way to know who was logged onto an intranet and available for question or comment.

But new products, such as Ding! Enterprise from Activerse, Inc. and ichat, Inc.'s Rooms, now package the AOL "buddy list" concept as a feature for intranets. Pristine Capital Management, for example, uses Rooms to provide a continuous stream of investment advice to customers over an extranet.

Conferencing

Conferencing is differentiated from other collaboration tools by its ability to provide disparately located users a way to interact in real time. Conferencing tools package collaboration features, such as chat and discussion databases, with audio or video capabilities and a whiteboard. A whiteboard lets different users mark up a document and share comments and revisions.

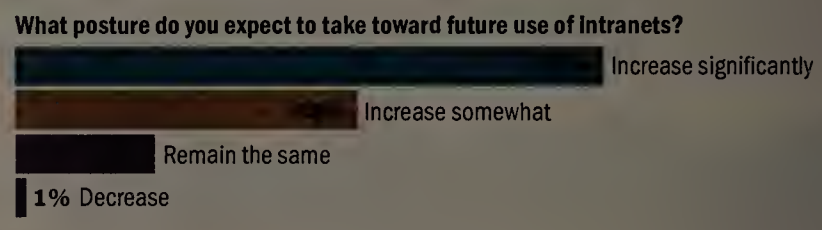
Real-time document collaboration rates high on priority lists for the next 18 months, according to our survey. It surpassed push, intelligent agents, content agents, chat rooms and wireless broadcast.

Distance learning has fueled the use of conferencing tools such as Symposium from Centra Software, Inc. The University of Tennessee's College of Business, for example, is

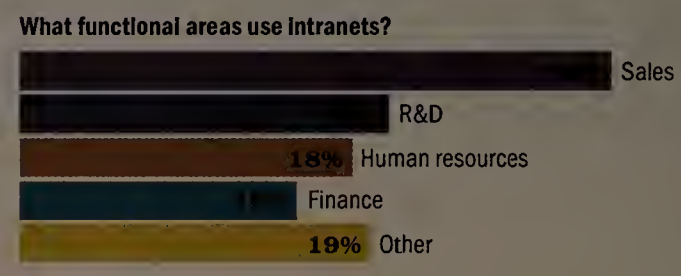
COLLABORATIVE INSIGHT

Nextera Enterprises LLC and *Network World* conducted an e-mail survey last month of enterprise network managers and Webmasters whose networking equipment is valued at more than $1 million. Our objective was to understand what knowledge-sharing platforms companies are using, what features these platforms include today and what they will incorporate over the next 18 months.

Slightly more than one-half of the 90 respondents have companywide intranet applications. The majority indicate that intranets will see much increased use.

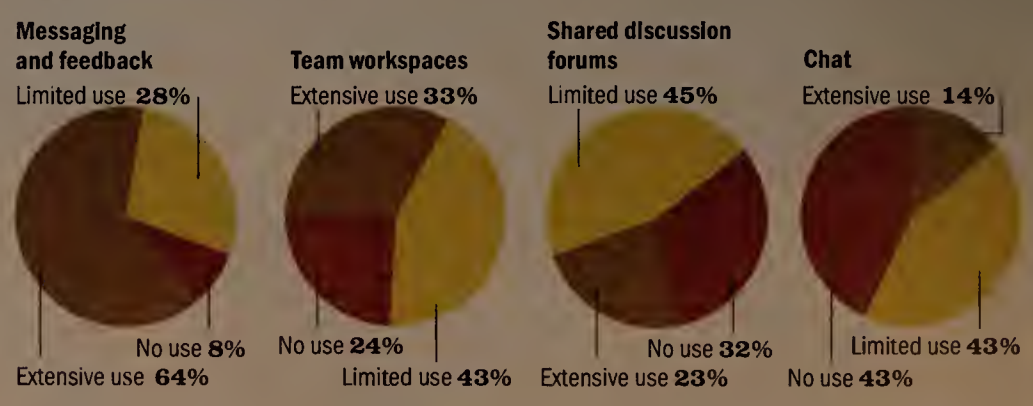


The survey also shows that intranets are evolving from corporate-wide information sources to targeted information- or collaboration-specific applications used by defined groups. The sales organization is most likely to use an intranet application.



More than one response allowed.

According to respondents, messaging and feedback are the most extensively used collaboration features. Team workspaces, chat and discussion forums are incorporated to some degree into the majority of knowledge-sharing applications.



*These features could apply to groupware, document management, intranet or enterprise integration systems.

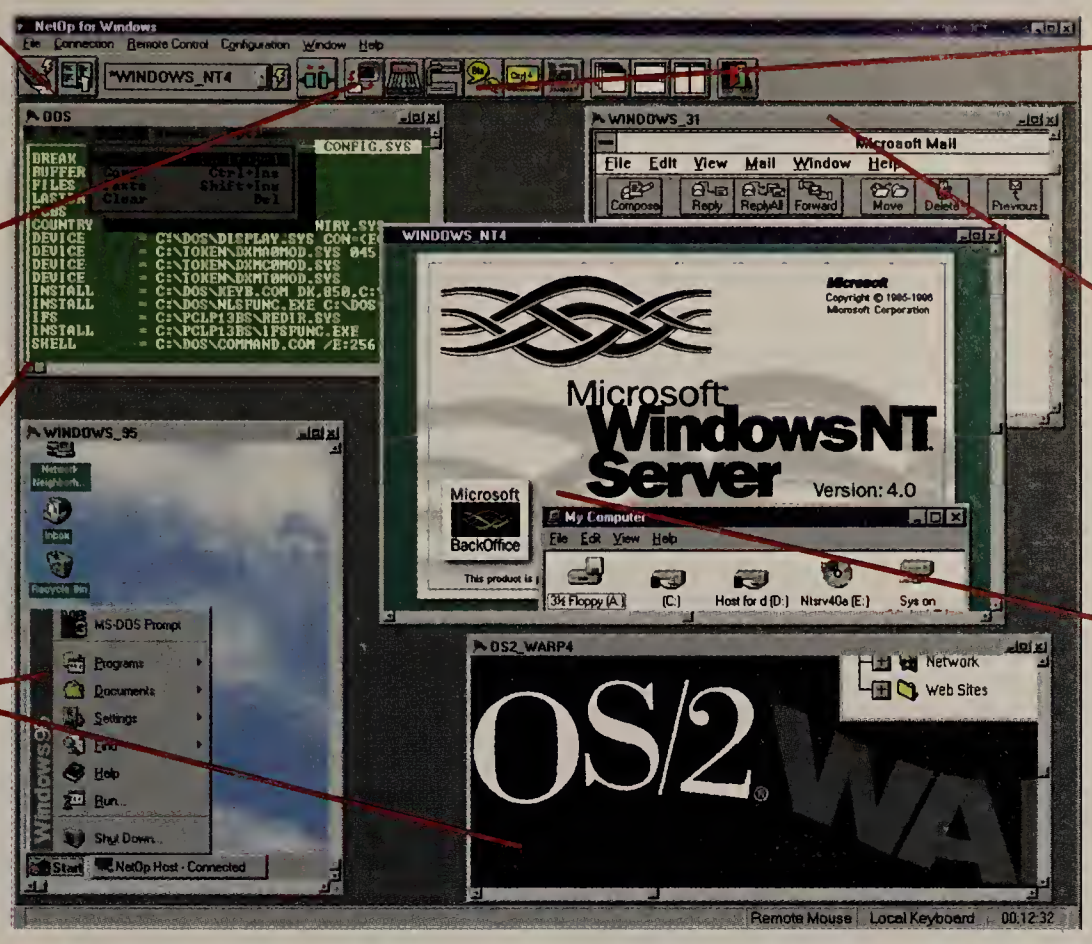
— *Dawne Shand*

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using this Web-based training tool on its intranet to provide courses for a new Physician Executive MBA program. Symposium combines audioconferencing with intranet collaboration so users can hear a teacher's instruction, use a shared whiteboard and check their progress.

Some conferencing products, such as Conferease from Outreach Technologies, offer an intuitive way of scheduling and conducting conferences so users don't need IT's help. Conferease, for example, integrates audio communications with real-time document collaboration over an intranet.

Many intranet managers find that videoconferencing is not a critical application, especially if the audio and data collaboration capabilities are adequate. That's a good thing, because videoconferencing over the intranet is still too expensive and complicated for most companies, experts say.

Shared workspaces

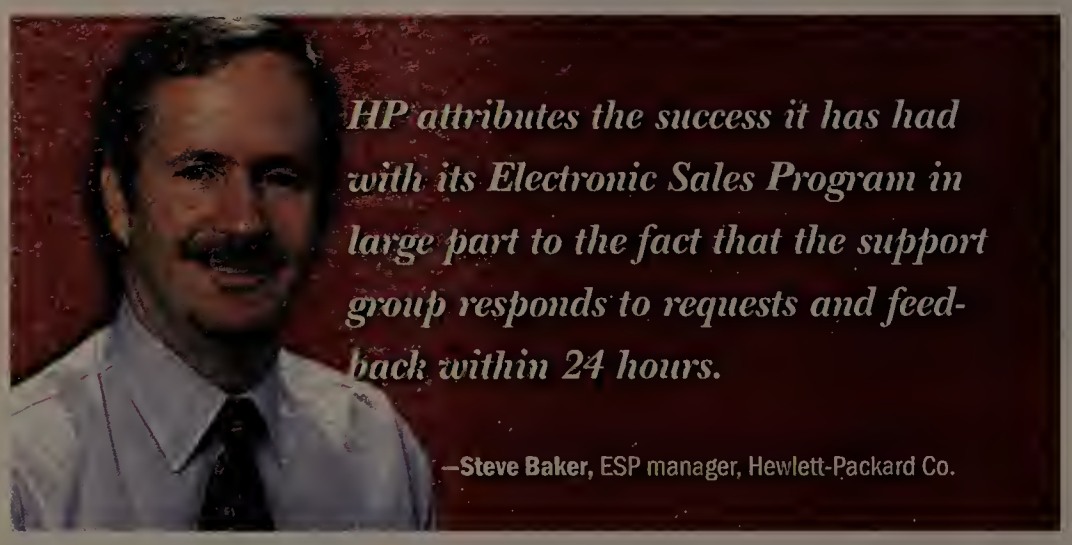
Shared workspaces enable electronic teaming by integrating collaboration features, such as chat and discussion, with document management tools. These applications allow a defined team with set objectives to manage all of its interactions and documents in one place. The result is a comprehensive archive of a project's evolution. As project-based teams made up of mobile employees become more common, these tools become the glue for making this work style feasible.

Integral, Inc., a Boston-based firm that provides product development consulting to a global clientele, standardized on a Lotus Notes platform because it saw the potential of its shared workspace, TeamRoom, to jump start a knowledge management initiative. At any one time, Integral employees were engaged in 10 to 15 concurrent projects dealing with related problems across industries.

"We knew that any one team would benefit from understanding what other teams were doing in similar areas. By providing teams with a way to manage documents and facilitate group discussions, we knew we could look at work across teams to extract and publish best practices more easily," says Jeff Elton, a principal at Integral.

But Integral ran into several problems. Intuitively categorizing the mountain of documents that every project team generates proved difficult and some users resisted using the technology, for example.

Shared workspaces do not necessarily require complicated technical training. However, most businesses find that electronic teamwork is very different and requires a commitment to instituting new processes and support roles.



Many companies find that an upfront investment in training on effective work practices is crucial. The American Association for Retired Persons (AARP), for example, developed collaboration methodology, user training and named "process advisors" to support virtual teams as they used Changepoint Corp.'s involv Intranet, says Tony Habash, IT analyst for the AARP, in Washington, D.C.

Managing the implementation

For intranet collaboration to improve business performance, it needs to be built on a foundation of clearly defined business objectives and a design and implementation approach suited to achieving those objectives. Collaboration can foster a fairly random exchange of ideas between two functional areas, such as sales and customer service, or purposely support global teams. Implementing the correct tool does not ensure that collaboration will happen seamlessly.

Managing the new information flows that stem from intranet collaboration means paying careful attention to support requirements and incentives for sharing this information. HP attributes the success it has had with ESP in large part to the fact that the support group responds to requests and feedback within 24 hours. With-out defined roles and processes, this information would never be acted upon effectively.

In many cases, companies find it necessary to establish new support roles in the business unit. These rarely require additional staff. In Integral's case, for example, providing a team workspace coincided with the introduction of new knowledge management roles. Knowledge center managers became responsible for helping teams use the tool and being aware of other teams working on similar projects.

Collaborative intranet tools make it possible for team members to contribute from any place and at any time. However, it also requires a commitment to using each feature to perform specific tasks. Discussion databases serve a different communications goal than a conference whiteboard. Helping users make this distinction requires forethought and training.

Technical trends

Leading-edge computer solutions provider Olivetti Ricerca, in Ivrea, Italy, was among the first companies to create a collaborative intranet application. In 1995, Olivetti integrated highly structured software project documentation libraries with topical discussion groups. Its intranet provides an environment in which 600 engineers can learn about project innovations and discuss emerging trends in IT.

As tools such as Ding! or Consensus @nyWare are integrated into intranet applications, companies will be able to create increasingly sophisticated applications as Olivetti has done.

At the other end of the spectrum, the same collaborative features are rapidly becoming available in prepackaged intranet applications. A shared workspace is a combination of collaboration tools packaged with a specific business goal in mind: the support of electronic teaming.

This trend will enable companies to take advantage of intranet collaboration potential much faster. For example, Changepoint's involv Intranet met 90% of the AARP's collaborative needs out of the box, Habash says.

Another trend boosting intranet-based collaboration is the increasing availability of rentable and self-service applications. These services, by easing IT's burden in setting up and maintaining the applications, make collaboration more accessible to the general user population.

Among the collaborative services available for rent from Internet services providers is Lotus' Instant!TeamRoom, a scaled-down version of TeamRoom. Self-service applications include Changepoint's involv Intranet, Instinctive Technology's eRoom and Outreach Technologies' Conferease.

But be warned: Though the range of options available for integration or for packaged collaborative applications will increase, IT groups will face implementation problems outside their immediate control. Intranet collaboration engenders a greater need for supporting business processes. Defining these and making it clear how best to leverage the technology will remain the biggest obstacle to making intranet collaboration a reality.

Shand is the research project manager at Nextera Enterprises LLC, a Lexington, Mass.-based international consulting firm that specializes in assisting information-intensive companies evolve their business strategies, improve operating effectiveness and enhance underlying organizational skills. She can be reached at dshand@nextera.com.

COLLABORATIVE TOOL COLLECTION

The following is a sampling of collaboration tools ready for Intranets.

	Contact Information	Product	Pricing
CHAT			
Activerse Austin, Texas	(512) 708-1255 www.activerse.com	Ding!	$29.95 per client, $695 for server bundled with 20 clients
Ichat Austin	(512) 425-2200 www.ichat.com	Rooms	Starts at $1,595 for server and 25 concurrent-user license
See also: Mirabilis' ICQ and Netscape/AOL's Instant Messenger			
DISCUSSION FORUMS			
Soft Bicycle Washington, D.C.	(888) 565-2453 www.softbicycle.com	Consensus @nyWare	$895 for 25 concurrent-user license
See also: Allaire's Forums and Emerging Technology Solutions' Business-in-a-Box			
SHARED WORKSPACE			
Changepoint Richmond Hill, Ont.	(904) 886-7023 www.changepoint.com	involv Intranet 2.0	$5,000 server license, $90 to $50 per client depending on the volume
Instinctive Technology Cambridge, Mass.	(617) 497-6300 www.instinctive.com	eRoom 1.0	$545 for group of five
Lotus Cambridge	(617) 577-8500 www.lotus.com	Instant! TeamRoom	Approximately $15 per user monthly; available through ISPs.
See also: Intraactive's inTandem and Netmosphere's ActionPlan			
CONFERENCING			
Centra Software Lexington, Mass.	(781) 861-7000 www.centra.com	Symposium	$10,000 per server, $120 per client license
Outreach Technologies Colombia, Md.	(410) 792-8000 www.outreachtech.com	Conferease 500	$18,000 for 12 concurrent-user license
See also: Intel's Team Station System, Microsoft's NetMeeting and Netscape's Conference			

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Q&A Two rising stars: Intranets and e-mail

E-mail is more or less the communications lifeblood of many organizations, not to mention a part of the social system that provides a company's identity. And with the rise of the Internet, the use of corporate e-mail is rapidly expanding among disparately located employees and business partners.

The Internet Mail Consortium (IMC) watches over and manages this e-mail phenomenon. IMC Director Paul Hoffman provides his insights into the e-mail market and the relationship between intranets and e-mail in this interview with Mark Gibbs, IntraNet*'s editorial advisor.*



Paul Hoffman, IMC director, sees intranets and e-mail infinitely intertwined.

Intranets have made a huge impact on the way we communicate in organizations. We're now seeing new technologies, such as IP-based telephony, that easily fit into intranet thinking. Will the importance of e-mail diminish as a result?

No. In fact, I think it will increase.

There are basically two kinds of communication: instant [telephony and videoconferencing] and store and forward [e-mail]. You can't have instant communication unless all parties are available and interested at that moment. Let's face it: None of us like the increasing demands on our time, and scheduling is becoming more of a problem for everyone. Because of this, e-mail will become more popular because it lets the recipient decide when to view the message and when to respond.



What do you see as the most important issues intranet managers need to consider when planning e-mail strategies?

Interoperability and growth. If you buy a system that is a single-vendor solution, you are risking your company's communications abilities on that product. Multivendor, interoperable solutions are the only sane way to go these days, and that means using e-mail software that conforms to Internet standards like SMTP, MIME and IMAP.

Most IS people have discovered that it's hard to predict growth, so they try to use systems that will allow easy and unlimited growth. Today's Internet mail servers allow this kind of growth with almost no pain. Because of the design of the Internet, doubling the capacity of your mail servers can be almost as easy as buying a system that matches your current one and putting them next to each other.

Do you think that secure e-mail products are ready for prime time?

Today's secure e-mail products certainly work well, but few companies have determined what they need them for. We have barely started to think about the public key infrastructure, so authentication is still in its infancy due to us, not due to the technology. Encryption works well, but few companies have thought about whether they need strong encryption across their networks, and if so, how to enforce rules for it.



Interoperability is currently a hot topic for the IMC. Why is this and what are you finding in your testing of e-mail, Domain Naming System and Local Access Directory Protocol products?

The purpose of our interoperability events is to test real-world interoperability, not conformance to standards. Saying 'we implement this protocol fully' is fine and good, but there are plenty of areas in every protocol to which companies think they conform but they still might not interoperate.

The only way to find out where products don't interoperate and to fix the problem is to get the developers together in a room. At all of our events, most participants have walked away with a list of bugs and a list of things they should do to make their software work better with other products.

Unsolicited bulk e-mail (UBE), or "spam," has become a major annoyance. What is the IMC position and recommendations regarding it?

Our position is simple: UBE is harmful to the world of Internet mail. We are trying to find purely technical solutions to alleviate the harms of UBE, but so far have only come up with partial solutions that won't scale well if the amount of UBE increases, as we all expect it will.

As for recommendations, if you're a legitimate company don't send out UBE. There's a good chance your recipients will hate you for it, and that your message will be thought of as positively as other UBE that the recipients get [such as for pornography sites and scam offers].

We don't have any concrete recommendations to companies about what to do about spam other than to be sure that if you're going to filter, understand that you might lose valuable business communications in your filter. We've already seen many examples of this, where a filter rejects messages from business associates.

Diversity and Authority

"Lack of homogeneity in speed of information movement creates diversity of patterns in organization. It is quite predictable, then, that any new means of moving information will alter any power structure whatever. So long as the new means is everywhere available at the same time, there is a possibility that the structure may be changed without breakdown. Where there are great discrepancies in speeds of movement, as between air and travel or between telephone and typewriter, serious conflicts occur within organizations."

— Marshall McLuhan, *Understanding Media: The Extensions of Man*



No matter how your intranet started, employees have undoubtedly raised a number of questions regarding ownership. Who is responsible for the intranet? Who owns it? Who has access rights, and at what level?

The usual answer to the intranet ownership issue is that control lies with the IT group first and then with those departments that have the best relationship with that group. It comes down to territorial issues and political agendas. For example, if the chief information officer doesn't like the chief financial officer, chances are that the intranet will provide lesser service to the accounting department than it does to, say, human resources.

However, if HR started its own intranet, than an IT department with political clout would probably charge in wearing virtual jackboots and claim ownership. The implied danger of some other group usurping IT's area of dominance and expertise is intolerable.

When the political balance is not in IT's favor, there could be a major corporate problem. If IT can't exercise the control it feels appropriate, it may be uncooperative with those needing technical help with the intranet, thus engendering bad feelings among departmental peers.



JOEL NAKAMURA

But the consequence of an intranet is at least significant and always enduring. The intranet phenomenon exemplifies McLuhan's theory: This information tool provides a new means of moving information far faster than previous solutions.

New thinking about the meaning of content, new ideas about the relevance of information and new imperatives of ownership come in the wake of an intranet going public. McLuhan could have been writing his diversity of patterns theory about intranets.

The previous computing evolutions, from mainframes to minis to PCs and then to LANs, differ significantly from the intranet phenomenon. When the former computing platforms emerged, they weren't "everywhere available at the same time," as McLuhan would say. Rather, they appeared first in strategic business operations and eventually became more commonplace.

The reincarnation of data-processing departments as MIS operations and then as IT groups changed corporate power structures. True to McLuhan's words, serious conflicts arose — in this case, when data-processing managers morphed into far more powerful CIOs and caused a redistribution of power in boardrooms.

But for all the upheaval, this evolution has served corporations well. It introduced a focus on organizing and optimizing business processes that is essentially the foundation of modern business.

Now intranets have become so powerful that not making them a general service within the corporation could create, as McLuhan predicted, serious conflicts in the organizational matrix.

It's critical not to create dangerous political schisms with other groups and, as a crucial side effect, not to erode IT's value and importance. It's imperative, then, to ensure that intranets are ubiquitous and democratic, and that means making sure everyone can access the intranet *and* provide content for it.

The bottom line: To maintain IT's strategic corporate role in the era of intranets, IT managers have to orient themselves to the supply of generic service rather than to the provision of spot high-tech applications. The "new" IT must ensure that intranet service is easily available, that intranet content is relevant and that intranet users can publish what they think is important and find what they need.

IT's new context will be crucial to corporate power structures. Lest you think otherwise, just consider that the newest corporate role — chief knowledge officer — arises out of intranets. But this role isn't necessarily or usually an IT function. It's possible that it could be filled by one of any number of disciplines that might do little or nothing to maintain IT's authority. In such an environment, influence matters.

And one of the truisms in corporate life is that once you've had high political authority and you lose it, you run the risk of never regaining it.

For IT, the key to maintaining the corporate status quo is enlightenment and the willingness and ability to act on that insight. Realize that rolling out an intranet for the whole corporation and allowing users to manage their own data resources permits them freedom while granting greater authority to IT.

The era when IT could call the shots with impunity is coming to an end. If you intend for IT to remain in authority, you will need to reposition what you do and how you do it. As Kenneth Blanchard, coauthor of *The One Minute Manager* put it: "The key to successful leadership today is influence, not authority."

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Intranet Applications

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Briefs

■ **NetObjects, Inc.,** *a Redwood City, Calif., vendor of Web site development tools, last week announced it will acquire Web scripting software and related technology from* **Acadia Software, Inc.,** *of Boxborough, Mass., for an undisclosed sum. Under the agreement, NetObjects is offering an enhanced version of Acadia Infuse called NetObjects ScriptBuilder 2.0. NetObjects, a privately held company backed by IBM, under the agreement also obtained Acadia's JavaScript Bean Builder technology.*



■ **Network Associates, Inc.,** *plans to ship its CyberCop* **intrusion detection software** *on Feb. 29. The offering, which the company said complements firewalls, includes sensors that can be distributed across a network to report suspicious activity to a central management console.*

CyberCop starts at $8,995 per sensor.

✆ Network Associates: (408) 988-3832

■ *Start-up* **AvantGo, Inc.,** *of San Mateo, Calif., last week unveiled software designed to allow mobile workers to run enterprise applications on handheld computers. AvantGo Web client and AvantGo Desktop will enable users of devices such as* **3Com Corp.'s PalmPilot** *to access information on corporate intranets, including employee directories, price lists and inventory. The software stores standard HTML and text files, along with GIF and JPEG graphics images. Both software components are available now as a package for $99 per seat. Users need AvantGo software, a desktop or laptop computer running Windows 95 or NT and a handheld device.*

✆ AvantGo: (650) 638-3399

Companies finding Web access rollouts to be double-edged swords

By Sandra Gittlen

Department managers at light bulb maker Osram Sylvania Corp. for years hounded their network systems division to get World Wide Web access. But once the Internet floodgate was opened to the company's more than 10,000 employees last summer, those managers quickly asked for it to be resealed.

"Managers noticed people were wasting time on the 'Net," said Robert Aragao, a network engineer at Sylvania, in Danvers, Mass.

"The manufacturing floor was just supposed to be using the Internet for order entry," but manufacturing employees wound up spending too much time surfing, he said.

Sylvania is just one of many companies that are learning the ins and outs of providing Web access. Based on his experience, Aragao cautioned network managers to consider three things before rolling out universal Web access: how different employees are going to use the 'Net; what the business impact will be; and how network bandwidth will be affected.

To combat the problem of employees wasting time on the Internet, Sylvania is installing a proxy server that will limit 'Net access to employees preapproved by the IS department.

Other employees only will have access to the company's intranet, which contains human resources updates and product information.

The business impact of Sylvania's universal rollout was tremendous, Aragao said. The company's IS staff was spending an enormous amount of time on Internet issues instead of other network concerns.

In addition, productivity was hurt, because employees were surfing the Internet for pleasure rather than for business purposes.

TAKING THE LEAP INTO WEB ACCESS

IS managers should consider these questions before giving all employees Internet access:

1. How will 'Net access boost an employee's productivity?
2. What will the business impact be for the company? Will Internet access contribute to the company's bottom line by giving employees quick access to product and company information?
3. What are the network's bandwidth constraints? Is the company prepared for an increase in traffic?



Sylvania also plans to install a Web filtering tool, such as The Learning Co.'s Cyber Patrol, to limit what employees with Web access can view.

Other headaches surfaced as more of the company's employees hopped online.

"There was an immediate [network] reaction to the rollout," Aragao said. The net eventually buckled under the strain from carrying increased traffic, which forced the IS department to triple the speed of its Internet link from 512K bit/sec to 1.544M bit/sec, he said.

Hopping into muddy water

Dan Henderson, information technology director for magazine publisher Forbes, Inc., is just starting to face the problems outlined by Aragao, as well as some different challenges.

In September, Forbes began handing out Web access to only a few employees in its New York office, opting not to roll out access to all of its remote bureaus.

What Henderson found was a tangled mess of politics between departments. Editorial departments said their reporters needed access for research, while sales managers said giving sales people 'Net access would contribute to the company's bottom line.

Rolling out Web access is "a management issue, not a technology one," Henderson said. "We had to make the decision: Is this going to be a technology given out by Big Brother the company or by the department?"

Forbes has proceeded with caution, giving departments control over which employees receive Web access but forcing departments to justify their decisions.

Departments are even sometimes responsible for the costs incurred by employees dialing in to the network, Henderson said.

For instance, if a department wants its employees to have remote access, then the cost of adding a firewall could be charged to that department, he said. ■

Check Point charts its firewall direction

X.509 support and hardware-based encryption on tap for FireWall-1.

By Ellen Messmer
Redwood City, Calif.

Check Point Software Technologies, Ltd. today will lay out plans to buttress its flagship firewall with support for X.509 certificates, hardware-based encryption and other technologies.

Under a cross-licensing agreement with Entrust Technologies, Inc., Check Point will ensure that its FireWall-1 can authenticate end users for remote access based on their Entrust X.509 certificates.

Once Check Point completes its work with Entrust to develop a set of APIs for this type of validation check, Check Point will publish the APIs so other certificate authority product vendors, such as VeriSign, Inc., can use them.

Check Point also is improving the speed with which FireWall-1 can encrypt and decrypt confidential IP traffic.

The company will do this by adding support for hardware-based encryption technology, which is faster than FireWall-1's existing software-based encryption technology.

Check Point will offer PCI-based 10M bit/sec or 100M bit/sec accelerator boards co-developed with Canadian manufacturer Chrysalis-ITS. The boards, for workstations running Solaris or Windows NT, speed up all encryption processing associated with the IETF's IP Security standard.

Also on Check Point's agenda this year is the integration of the company's FloodGate-1 traffic prioritization technology in to FireWall-1. FloodGate-1 currently sits behind FireWall-1 and handles congestion control for traffic entering or exiting the firewall.

"Customers are telling us they don't want to have stand-alone devices for security anymore," said Jacqueline Ross, Check Point's vice president of marketing.

However, Check Point will continue to sell FloodGate-1 separately.

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NET INSIDER

Unfillable expectations

Why do so many good technical people prefer to plan based on wishful thinking rather than the facts?

The particular thing that got me wondering about this was yet another instance where some people asserted that in the near future there was going to be an explosion of cheap Internet bandwidth for individual users. They did not quite repeat the claim that bandwidth was going to be too cheap to measure, a claim which is popular with some people, but they were getting close.

The identity of these specific myth spreaders is unimportant only because they are far from alone in their beliefs.

It would be easy to do a little checking and figure out how much money the fiber people, such as Qwest, MFS and Project Oxygen (www.oxygen.org), and the Internet service providers, such as MCI Communications, GTE/BBN and UUNET, plan to spend. But what I can tell you is that they plan to spend far in excess of the $3.3 billion in annual revenue generated by all ISPs in the U.S.

This would seem to indicate that unless these companies are suddenly about to become somewhat more altruistic than their previous histories would indicate, cheap bandwidth is a pipe dream — an attractive one — but a pipe dream nonetheless.

But this is far from the only example of this sort of reality disconnect. A few years ago, people were assuming ATM was going to replace all other network technology.

Even a bit of thinking would have indicated that any wholesale replacement of network infrastructure with ATM was not in the cards. There are just too many alternatives and too much installed technology.



Scott Bradner

Besides, the network technologists were not about to stop thinking when ATM was designed — new technologies were bound to be developed.

Today, we see a reality disconnect in the belief by some that most Internet users already have some level of high-speed access. At least that's my impression judging by the amount of graphics that all too many designers put on their Web pages.

It's very broken thinking to design Web pages that take many minutes to download — with much of that time taken in transferring complex advertisements — and expect Internet users will still be happy to deal with you and come back for more abuse.

What is it that causes this type of inability or unwillingness to recognize reality?

Clearly, some of the problem comes from a need to attract venture capital and sell products. Clear, impressive stories are easier to sell than ones with qualifiers.

Part of the problem also comes from the surface knowledge of the issues that many network managers and technology writers possess. On the Web side, showing your boss a Web page that is designed to accommodate the level of connectivity that real users have is not all that rewarding an experience.

But the basic issue may be just that complexity is a pain. It takes time and makes people's heads hurt to actually think through the implications of reality.

Disclaimer: Harvard's organizational structure can make my head hurt, but the above are my musings.

Bradner is a consultant with Harvard University's University Information Systems. He can be reached at sob@harvard.edu.









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SPECIAL FOCUS

Web software

Netscape's enterprise challenge

By Andy Eddy

In the gloomy shadow of its multimillion dollar fourth quarter loss, Netscape Communications Corp. is battling to prove that it's capable of supplying more than just browser and Web server software.

The company's plan to win a big chunk of the enterprise network software market is off to a rough start despite Netscape's growing product portfolio, which includes messaging, groupware, directory and electronic commerce offerings.

CEO James Barksdale has acknowledged that Microsoft Corp.'s relentless competition hurt Netscape sales in the fourth quarter, and that it took much longer to close enterprise contracts than the company expected. In addition, Netscape announced its first-ever layoffs and has become the subject of takeover rumors.

Given all this, are customers willing to take a chance on Netscape in the enterprise?

Perhaps.

Customers interviewed by *Network World* say they have been impressed with Netscape's Communicator client and SuiteSpot server suites and would consider deploying a greater variety of Netscape products across their networks.

Netscape will get some additional encouragement from survey results soon to be released by Creative Networks, Inc., a research and consulting firm in Palo Alto, Calif. The survey details interviews with 84 organizations regarding their use of Lotus Development Corp.'s Domino Web server, Microsoft's Internet Information Server (IIS) and Netscape's Enterprise Server, in such areas as content publishing, vendor support and application development.

Creative Networks found that no software provider was the "hands-down leader or achieved an unassailable market position." But Netscape received the highest marks in 17 of 23 specific areas — including scalability, performance, reliability and compliance with industry standards — in the overall category of system characteristics.

By contrast, Microsoft topped only three of the 75 datapoints that make up the survey. Most notably, the company won in customer loyalty. Microsoft customers said they are unlikely to consider switching to another product.

The main thing that Netscape has going for it is that it is a relatively new company in a market that is still in its infancy, says Nina Burns, president and founder of Creative Networks.

"What [Netscape] is building is from the ground up, while Microsoft and Lotus have to transition into this space," Burns says. "[Netscape] is inhibited from a marketing standpoint, not from a development standpoint."

She emphasizes that Netscape had the advantage of building its products on a standards-based foundation from the start because it didn't have products rooted in proprietary implementations.

Netscape's ability to deliver a cross-platform set of software is a major selling point, according to some customers.



BILL FARRELL

US WEST's Rebecca McDonald *switched her company to a Netscape e-mail system to save money and ease management, but isn't convinced that Netscape's Collabra should replace legacy groupware.*

LSI Logic Corp., a Milpitas, Calif.-based semiconductor manufacturer, chose Netscape's SuiteSpot servers and Communicator Pro client applications to run across its global network of Solaris and Windows NT servers.

"Usage is split 50/50 with Unix and Windows, and we needed a cross-platform solution," says Phil Wolff, program manager for LSI Logic. "We use Netscape products across the board."

Similarly, Pacific Enterprises, a Los Angeles-based utility holding company, has deployed a series of Netscape Enterprise, Directory and Certificate servers across its network. Of the company's 12 primary production servers, nine run Netscape software.

"I could set up a server in Unix and if we ever moved over to NT, we could easily move our Netscape applications over," says Doug Wong, Pacific Enterprises' Webmaster. "I know I won't be able to move Microsoft's [Lightweight Directory Access Protocol] server to Unix."

Decision time

However, Wong notes that while Pacific Enterprises is using Netscape servers for many applications, it's using Microsoft's IIS for others, such as an in-house paging system.

The IIS choice is easy to explain. The software comes bundled for free with NT and shares technology with NT, including directory database security, Wong says.

According to Burns, the increasingly ubiquitous nature of NT presents a huge problem for Netscape as more companies develop strong brand loyalty to Microsoft. Lotus customers can be fiercely loyal, too, she says.

Even for companies willing to cut their ties to existing software packages, making a wholesale change to Netscape software can be a tough call.

For instance, US WEST, Inc. decided to untangle a nest of 13 e-mail systems by moving to Netscape's messaging software, says Rebecca McDonald, director of virtual office technology at the Denver-based telecommunications firm.

"We looked at what was out there that was Internet-standard compliant and what could be deployed very quickly to eliminate the existing systems," McDonald says.

However, US WEST stopped short of rolling out Netscape's Collabra groupware offering, deciding that it would be too messy to replace an existing Lotus Notes infrastructure. In addition, Lotus still has the premier workflow product, McDonald says.

Encouraging moves

While plenty of customers remain skeptical about investing too heavily in Netscape's enterprise software suite, many are encouraged by Netscape's product direction.

In recent months, Netscape has bolstered its electronic commerce story by buying out GE Information Services' share of its Actra Business Systems LLC venture with Netscape. Netscape's recent acquisition of Kiva Software Corp., a maker of transaction-oriented Web server software, also has been hailed by many customers.

"[Netscape seems] to be staying flexible and responding quickly, but the industry changes so much," LSI Logic's Wolff says. "What's right today won't be right in six months to a year. [Netscape] has to keep listening and reacting to things outside of its control." ■

Technology Update

Covering: Evolving Technologies and Standards

NUTTER'S NETWORK HELP DESK

Ron Nutter, a Master Certified Novell Engineer and Groupware CNE in the Lexington, Ky., area, tracks down the answers to your questions. Call (800) 622-1108, Ext. 7476, or send your questions to rnutter@world.std.com.

I need help finding out about something called "A bit support" in frame relay networks. As I understand it, when a local Data Link Connection Identifier fails, the frame relay switch sends an A bit informing the remote DLCIs. If you've configured your routers for dial backup, the remote routers will dial in to the hub site router to establish a PPP connection. Without the A bit, remote routers would never know of a logical or physical failure on the main telephone company link from the hub site router to the frame relay cloud.

I have been unable to find any A bit request for comments or ANSI documentation, and technicians I talked to at AT&T and Bell Atlantic have never heard of it. I would appreciate your assistance in finding out more information on the A bit and how it works.

Paul Grew, network engineer
Bay State Computer Group
Boston

In researching an answer to your question, I talked to a couple of frame relay network designers for GTE Telephone Operations, in Lexington, Ky. According to them, it's understandable that the telephone company folks you talked to weren't familiar with the A bit. That's because you're inquiring about a standard from the ISO, not ANSI.

The A bit, which also is known as a Delta T field, can provide one of the three following conditions: congestion notification, exceeding committed information rate notify and permanent virtual circuit status. How the A bit is implemented will depend largely on what protocol — line management interface, Annex D or Annex A — your telephone company is using.

The GTE designers said most routers can bring up a dial-on-demand link over regular dial-up lines to establish a temporary connection until regular service is restored. They suggested checking out www.ieee.com for further information.

Boosting IP backbone performance

Using IP-based technology in a switch can improve router throughput.

By Randy Fardal

Multilayer switches can offer a high-performance, low-cost alternative to traditional routers.

In most cases, for a fraction of the price of a router, a multilayer switch can forward packets — at Layer 2 and Layer 3 — between multiple 100M bit/sec or even 1G bit/sec LANs at wire-speed.

But most multilayer switches are really just hardware-based routers. Like routers, they employ protocols such as Routing Information Protocol (RIP) or Open Shortest Path First (OSPF) to calculate paths through the network. So for a network manager, adding a multilayer switch to an existing network can be as much work as adding a router. The manager must still do a lot of manual labor, such as reconfiguring ports and reassigning subnetwork numbers. The effort and disruption can be a barrier to deployment.

To provide a simple, nondisruptive performance boost, some multilayer switches support IP autoconfiguration. By inspecting incoming broadcast packets, switches supporting IP autoconfiguration can determine the whereabouts of local IP subnetworks and endstations without using a routing protocol. The learning process is transparent to network devices and requires no manual configuration.

Because IP autoconfiguration relies solely on standard IP family protocols such as Address Resolution Protocol (ARP) and Internet Control Message Protocol (ICMP), it can be deployed directly into existing networks.

And because IP autoconfiguration doesn't rely on a routing protocol, it works equally well in networks that use RIP, OSPF and even Cisco Systems, Inc.'s Interior Gateway Routing Protocol.

Typically, a multilayer switch with IP autoconfiguration is placed between a backbone router and its LANs.

Autoconfiguration begins by discovering the Layer 3 topology of the network. To find the router and learn its port addresses, the switch emits ICMP requests and interprets the replies. It also observes routing protocol updates that arrive periodically from the backbone router.

To learn the locations and numbers of attached LAN segments, the switch inspects the IP source addresses of incoming ARP requests. Based on this information, the switch creates logical connections — virtual LANs really — between each router port and any LAN segments in the same subnetwork.

Snooping

By "snooping" on ARPs, IP autoconfiguration also learns the whereabouts of individual endstations. Every IP device broadcasts ARPs in order to learn the media access control (MAC) addresses of other IP devices. The switch relays these broadcasts to all segments within the appropriate subnetwork. It also copies the Layer 2 (MAC) and Layer 3 (IP) addresses of the sources, along with the incoming port numbers, into its forwarding table.

When the switch receives a packet from a local endstation, it first determines if the packet is traveling between subnetworks. If not, it switches the packet to the proper output port based on the packet's destination MAC address — classic Layer 2 switching. All non-IP packets and all packets coming from the router also are switched at Layer 2.

If the packet is traveling between subnetworks, the switch looks up the destination IP address in its forwarding table. If there's no match, the switch relays the packet to the router. The packet may be bound for the wide area or for a local device that hasn't yet broadcast an ARP. In either case, the router invokes standard mechanisms for forwarding the packet.

If the switch finds a match for the destination address, it performs functions such as address substitutions, calculates a new checksum and directs the packet to the proper LAN segment — just like a router, only faster. Rather than identify itself as the source, however, the switch uses the MAC address of the appropriate port on the backbone router. The switch, therefore, is completely transparent to source and destination devices.

Going around the router

IP autoconfiguration improves network performance by bypassing the router whenever possible. Once the forwarding table is built — in a matter of a few seconds — virtually all local traffic is routed or bridged by the multilayer switch. The router is relieved of its local IP forwarding burden and can concentrate on moving wide-area and non-IP traffic more effectively.

Remarkably, all of this is achieved without requiring the network manager to configure the multilayer switch or the router.

Products that support IP autoconfiguration offer a transition path from traditional software-based routing to next-generation multilayer switching. Because they rely on well-established standards, these devices are ready for immediate deployment into existing networks.

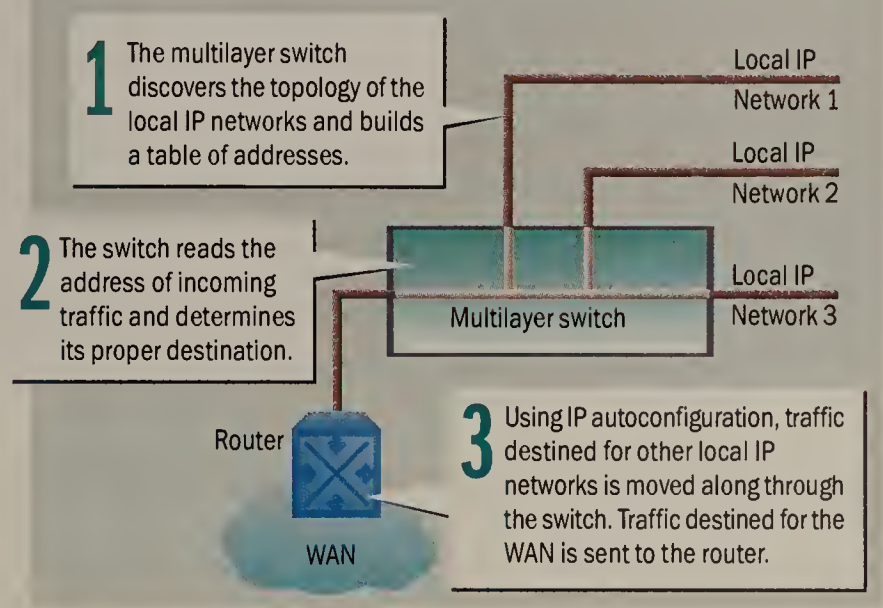
Some multilayer switches support autoconfiguration and full routing. With these the network manager can begin with autoconfiguration mode for a quick performance boost. As application requirements evolve, the network manager then can turn on full routing for more flexible, robust path determination.

Fardal is vice president of marketing with FlowWise Networks, Inc. He can be reached at (408) 474-0385.

HOW IT WORKS

Using IP autoconfiguration in a multilayer switch

IP autoconfiguration improves network performance by bypassing the router whenever possible. Once the switch learns network addresses, all local traffic is routed or bridged by the multilayer switch, relieving the router of its local IP forwarding duties.



Need information?

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EDITORIAL *insights*

The seven habits of highly effective net managers

Bestselling author Stephen Covey hit on a winning model with his *The 7 Habits of Highly Effective People.* So in classic Microsoft fashion, I'm going to, ahem, validate the concept for our readers.

1. Finish what you start. Network projects are disruptive. But nothing fuels the fires of wrath like multiple, never-ending network projects. Set firm deadlines for Project A and meet them before you move on to Projects B, C and so on. Your customers will love you.

2. Read, read and read some more. Dealing with change is your most important skill, and the only way to deal with change is to face it head on. Read everything you can. Read *Network World* (shameless, no?), but also read publications about your specific industry so you understand what your company is facing. Read *BusinessWeek* or *Forbes, The Wall Street Journal* or *Harvard Business Review.* Find out what's coming down the highway before it flattens you.

3. Have lunch with the right people. Eat with department managers, the chief financial officer, peers in other companies. Break bread with people who open your eyes to new ideas. Don't wolf down a white bread sandwich at your desk when you can eat on the company's dime and build up your mind, stature and visibility.

4. Pay for quality. Sure, budgets are tight, and upper management is squeezing you. But go to bat for the best people and products. In the long run, that will save your reputation and your sanity. Hire the best, even if it hurts initially. Buy from companies with strong support and a track record of quality. I'm amazed how often people opt for a low-cost solution and long-term problems.

5. Don't buy Microsoft network products early on. Remember LAN Manager? The early versions of NT? The ongoing evolution of Exchange? When it comes to network products, Microsoft takes its time getting things enterprise-ready. Do you really want to be a beta site for the next three or four years? Consider that when you are looking for, say, a directory.

6. Weasel your way into the hot project. Ideally, you'll be thinking up new ways for networking to expand the business. But in the absence of any brainstorms, make sure to get involved in the high-profile ventures in your company. You'll get more visibility, credibility and — maybe — more money for your group.

7. Know what you're worth. Don't be a job-hopper, but keep tabs on your market value. Get to know a reputable recruiter and learn what opportunities are out there. Your skills are hot and you have to make the most of your one career. Besides, it doesn't hurt if your current employer knows that other companies covet your skills.

Those are my 7 Habits. What are yours?

John Gallant, editor in chief jgallant@nww.com

Venture Over the Horizon • Kevin Fong

The urge to converge will mark the year ahead



The notion that telephone companies are in the voice business, cable companies are in the broadcast business and network companies are in the data business has not been true for several years. This year, those barriers that still separate the three areas will disappear at an increasing rate. The convergence trend will even extend to Cisco and Microsoft, which will be battling over whether network routing will be done with specialized hardware or general-purpose computers running routing software.

Cisco's acquisition of asymmetric digital subscriber line (DSL) supplier Dagaz Technologies and Lucent Technologies' purchase of Gigabit Ethernet start-up Prominet highlight the ways in which the telephone and data companies are converging.

While DSL technology has been touted as the telephone companies' answer to high-speed Internet access to the home, the main action right now is taking place at the telephone central office as the telcos scurry to convert their voice-switching capabilities to include data traffic.

On the network side, IP telephony and the convergence of data, voice and video are hot topics. Meanwhile, the cable companies are aggressively pursuing the opportunity to transport data along with their broadcasts. Microsoft's $1 billion investment in Comcast, the fourth-largest cable operator, indicates its interest in cable and the home set-top box.

From a venture perspective, companies that can supply the pieces that vendors such as Cisco or Lucent are not providing have a good opportunity to capitalize on this convergence of telephony and data. My company, Mayfield Fund, has invested in three companies — Redback Networks, Assured Access Technologies and Trellis Networks — that provide a better way of handling subscriber services in the central office.

Other technologies that will see a lot of activity this year will be those that can conceivably bridge the bandwidth gap between the office and home. The battle over who will provide high bandwidth to the home will heat up as both the telcos and cable companies begin significant deployment of solutions. They are being joined by the competitive local exchange carriers, which want to build regional high-speed data networks to provide remote LAN access to telecommuters as well as Internet service for small businesses.

The cable operators, banding together to support a de facto standard for cable modems called Multimedia Cable Network System (MCNS), are optimistic that they have a better bandwidth-to-the-home story than the telephone company's ISDN or DSL offerings. Virtually all analog modem vendors have rushed to announce MCNS modems, but so have network companies such as Bay Networks, which acquired modem maker LANcity in 1996; Cisco; and 3Com, through its US Robotics division.

Then there's the looming battle between Cisco and Microsoft over whether general-purpose computers can supplant specialized network hardware for routing. We may be approaching the point where routing becomes a commodity and specialized hardware becomes less and less relevant. Microsoft's project, code-named Steelhead, is aimed at developing routing software that runs on the same large number of hardware platforms that run NT.

Despite the long-term implications of convergence, it would be premature to say that this is the year it will all come together.

Nevertheless, you need to be aware of what is going on. The enterprise will be supporting more and more intranets along with mobile users. The continuing deployment of electronic commerce systems for consumers and businesses is tied to bandwidth availability. As the year progresses, convergence issues will continue to influence the direction of the industries involved.

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Send letters to nwnews@nww.com or John Gallant, editor in chief, Network World, *161 Worcester Road, Framingham, MA 01701. Please include phone number and address for verification.*

Mac comeback

I would like to comment on several points in your editorial "My plan for a Mac comeback" (Feb. 2, page 32):

Your statement "Apple has to lowe the comparatively high cost of owning Macs" leads people to believe that the purchase price of a Mac system is still higher than a comparative Wintel system. This is no longer true.

Your claim that there is a "dearth o applications" for the Mac really isn't true, either. Yes, PC applications outnumber Mac ones, but there are still many thousands of Mac applications. Just because there are more PC applic tions in total doesn't mean there are

Bandwidth hunger creates a Cache-22

If the folks at Cache Now! and the National Laboratory for Applied Network Research (NLANR) have their way, copies of your Web site will be pasted on dozens of servers in the U.S. and around the world without your knowledge or your permission.

The problem is bandwidth.

Your personal client browser, Netscape Navigator or Internet Explorer 4.X, caches recent Web site visits to your hard disk. The next time you visit the same site, the browser first looks to see if a copy of the requested URL is already in your hard disk cache. If it is, the load time is remarkably faster than the usual dial-up speed. Thus, personal caching is good.

At the backbone level, lack of sufficient bandwidth is a global problem. Internet telephony, cable modems that suck down data in the last mile at rates of 400K to 1.5M bit/sec, videoconferencing and multi-media requirements are filling the pipes of cyberspace as fast as fiber is installed. Thus the understandable desire to find a way to offload some of the massive bandwidth demand.



The proposed solution is simple. In addition to your personal cache, another cache would be added at the network level. Your Internet service provider would maintain an active cache of the most-often surfed Web sites and when you request that URL, instead of being routed to the actual server, your download occurs from the local ISP-maintained cache server. The result is a faster download speed.

Cache Now!, NLANR and a number of supporting international organizations want to go even further. They are promoting a hierarchical cache structure.

Let's say you request a URL from England. First, your browser would examine the client cache. If the URL is not there, it would then examine the network cache, then the regional U.S. cache, then the national U.S. cache, then the national U.K. cache, then the regional U.K. cache, then the network ISP cache. If the requested URL is not found at any of these points, then and only then will the browser access the actual server hosting the URL itself.

On the surface this method sounds sort of neat. RAM and CPU time are less expensive than bandwidth and require minimal infrastructure construction. Also, network bottlenecks might become less severe and network speed would increase.

But what about the effects on privacy, security and control over Web-based content? Some of my concerns include:

- **Cloning.** Content developers and Web owners have no knowledge of or control over who makes a copy of their pages.
- **Cache poisoning.** The original Web owner loses control over the accuracy and integrity of the clones. Digital signatures and strong key management are needed to prevent this glaring problem.
- **Legacy mindset.** If we rely upon hierarchical caches to improve the speed of the 'Net, the cache servers become single points of failure. This is an architectural step backwards to centralized management. Strong security controls are needed to protect the central databases.
- **Bad ads.** Advertising-based Web sites must be concerned about whether their hit counters measure visits to the clones as well as to the original server.
- **No refresh.** Many Web pages are dynamic, and the content is refreshed often. Surfers want the latest and greatest information, not last month's news. Care must be taken to synchronize the HTML, HTTP server and cached clones so traffic is routed to the proper server.
- **Double jeopardy.** If the cloned sites at the caches are indexed by search spiders, subsequent searches can find multiple copies of the same pages. Surfers can't tell the original from the clone and can't locate erroneous or old information.
- **Copyright law.** Content producers are concerned that illicit copies of their material constitute a breach of their intellectual property rights and may dilute the material's value.
- **Malicious clones.** Viruses and destructive Java and ActiveX code can be indiscriminately copied, causing additional damage. Who is responsible for its control and cached-based eradication?
- **X-rated material.** A disproportionate amount of Internet traffic is taken up by adult entertainment. Cache servers can easily become unwitting distributors of pornography.
- **Censorship.** At the regional and national levels, caches could potentially become single points of censorship dictated by the current reigning power.

As the Web becomes more commercial in nature and as more and more private information is stored and moved across international boundaries with little constraint, the problems associated with national and regional caching become more obvious.

It seems clear that if the problem is a lack of bandwidth, then the answer is to add more bandwidth, not a Band-Aid that's not big enough to cover the wound.

For a complete look at both sides of network caching, check out www.goforit.com/cache/ and http://ircache.nlanr.net/Cache/Learn/learn-4.html.

Schwartau is chief operating officer of The Security Experts, Inc., an information security consulting firm, in Seminole, Fla., and president of infowar.com. He can be reached at winn@securityexperts.com or winn@infowar.com.

more quality applications for PCs than Macs.

You'd have a hard time naming a major application that is not already cross-platform or file-compatible. In addition, MacLink translator software ships with MacOS 8.0 and 8.1 and allows you to translate to and from just about any file format in use today.

Incorporating Macs into a "PC-laden environment" is actually much easier than connecting a PC to a network. Because of the PC environment's socket approach to networking, changing network settings requires restarting the operating system for each change. The MacOS's Open-Transport networking relies on streams, much like Unix, to allow you to change network settings without restarting.

You're correct in saying Apple needs to cater to Java. In fact, the model you propose sounds an awful lot like the rumored Rhapsody server/MacOS network client computer model Larry Ellison has been leaking for months.

Kevin Farrell
Manager of information systems
Aberdeen Proving Ground
Fire Department
Aberdeen Proving Ground, Md.

Apple's Rhapsody plans of putting an advanced MacOS on PCs, Macs and Unix machines would answer one of your Apple concerns. But even with a MacOS, a PC is still a PC — the inherent weaknesses of PC hardware would still be there.

Regarding a "dearth of applications," there are more than 16,000 titles available for the Mac. Just because people don't see them all on store shelves doesn't mean they don't exist. It means that store owners base their purchasing plans on hardware market share, not software demand.

Trey Yancy
Chicago

Here's clear proof in my mind that the Mac is the superior platform from a hardware standpoint:

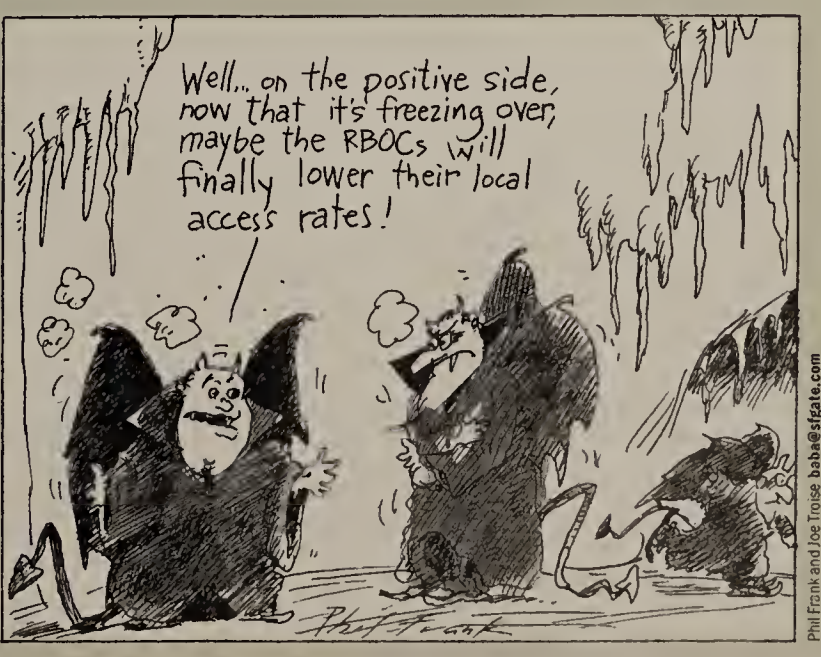
I provide technical support for two rooms at a direct mail/printing outfit. I am entirely self-taught. SCSI makes the whole plan work. You can drop these Macs and pick them up, plug them back in — and they work. When the G3 tabletop model came out, I opened one up just to admire how durably and organically it was assembled.

I have been sold on the Mac now for 12 years and have not wavered. Windows just plain doesn't cut it.

Thom Osburn
Internal Macintosh technical support
KAR Printing of Georgia
Atlanta

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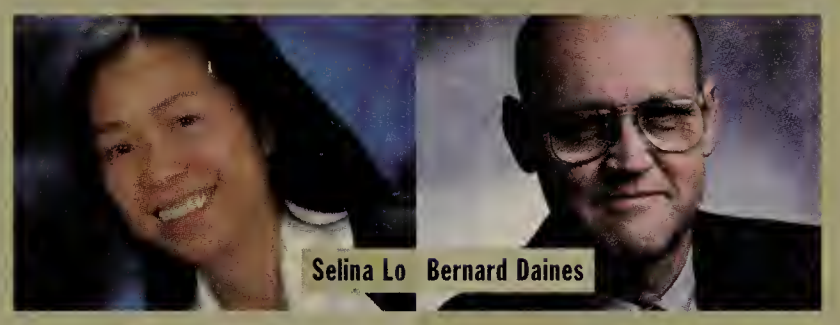
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HEAD to HEAD

Should the maximum size of Ethernet frames be increased?



Like everything else, Ethernet should evolve with time. High-speed network users have long felt the limitations of Ethernet's small frame sizes and are among the biggest proponents of Jumbo Frames — extended Ethernet frames that range in size from the standard 1,518 bytes up to 9,000 bytes.

The 1,518-byte frame size was designed to protect against the high bit error rates of yesterday's physical-layer Ethernet components. But computer processing power has increased by an order of magnitude, and the use of switched Ethernet over unshielded twisted pair or fiber media has significantly lowered Ethernet errors.

More importantly, the speed and capacity of today's Ethernets are pushing the processor limits of most installed servers, and more data is being transferred between servers.

For these reasons, extending Ethernet's frame size to reduce server overhead and increase throughput has become an attractive and logical option. Independent tests have verified that the use of Jumbo Frames can deliver a 50% increase in throughput with a simultaneous 50% decrease in CPU utilization.

Users clearly recognize the value of bigger frames, but to get them until now, they had to turn to less-mainstream technologies such as FDDI, High Performance Parallel Interface and Fibre Channel. The problem is these technologies lack the installed base, cost-effectiveness and seamless interoperability of Ethernet.

In the past, users who demanded the efficiency of large frame sizes had to build separate workgroup networks. Today, however, applications optimized for large frame sizes can easily be integrated with existing Ethernet LANs without causing interoperability problems. For example, you can partition a logical network in which systems can exchange Jumbo Frames and mark them with IEEE 802.1Q virtual LAN tags. The extended frames will be transparent to the rest of the network.

Adapters that implement IEEE 802.1Q can support different Ethernet frame sizes for different logical network interfaces. For example, a server could communicate with another server using Jumbo Frames while communicating with clients sitting on another VLAN or IP subnet using standard Ethernet frames — all via the same physical connection.

So how large should an Ethernet frame be? Ethernet's 32-bit cyclic redundancy check is effective for detecting bit errors at frame sizes under 12,000 bytes, thereby drawing a logical upper limit. Within that, the optimum large frame size can be determined by an application's block size. For example, Network File System (NFS) transfers data in 8,192-byte blocks. So adding room for headers, an attractive maximum Ethernet frame size for NFS applications is 9,000 bytes.

At the same time that traffic is increasing and ultra high-speed Gigabit Ethernet technology is emerging, conventional Ethernet's packaging of data into mini-chunks is inhibiting the ability of servers and applications to take full advantage of next-generation networks.

Extending Ethernet's frame size is a long-overdue step in the quest for speed.

Lo is vice president of products and markets for Alteon Networks, Inc., a server switching company in San Jose, Calif. She can be reached at slo@alteon.com. For more information about Jumbo Frames, check out www.alteon.com/jumbo.html and www.alteon.com/wpapers/jumbowp.html.

Let's get this out of the way: Increasing the size of Ethernet frames can improve a host computer's performance. But how big is the gain? What price must we pay for the improvement? Are there alternatives?

Although proponents claim larger packets improve performance "on the wire," the impact is relatively insignificant. Compare the efficiency of a 9,000-byte large-packet system with a standards-based 1,500-byte system. The standard packet gets 1,500 data bytes out of 1,538 bytes of frame and overhead, or 97.5% efficiency. The nonstandard packet gets 9,000 data bytes out of 9,038 bytes, or 99.6% efficiency. To put it another way, the difference in time required to send a 1M-byte file is only 0.1 msec.

These increases in efficiency and performance are insignificant compared with other delays and negative factors in the large-packet system. Furthermore, substantial costs are associated with diverging from the standards on which your network is based.

The greatest potential benefit of larger packets is improving the host computer's efficiency. In the host, the CPU interacts with the network interface card (NIC) to move packets from the wire to the application. Large packets minimize the CPU's workload by decreasing the number of transfers across the bus, the interrupt stack and the protocol stack. Thus, the challenge is to make the packet appear large in the system to offload the CPU while remaining standards-based on the wire.

To achieve this, today's NICs couple fast bus types with advanced direct memory access schemes to move data efficiently to the host's memory. Techniques such as transmit chaining and interrupt consolidation of received packets serve to group packets together to simulate a larger packet and minimize CPU interrupts. To maximize the protocol stack's efficiency, NICs are taking over many CPU-intensive tasks such as TCP/IP checksumming. Additional schemes will soon be available that will move more protocol stack functions, such as fragmentation and defragmentation of the IP packets, to the NIC. Together, these features provide the benefit of larger packets while still complying to standards and working seamlessly with the installed equipment.

Even if larger packets offer improved performance over other approaches, they exact a cost in terms of interoperability.

To get maximum benefit, large-packet capability would have to be propagated across the whole network. This would require that all existing devices, including NICs, hubs and switches, be replaced.

It is possible for large-packet networks to coexist with standard Ethernet networks by installing both NICs and switches that can handle multiple packet sizes. However, these features increase the cost, complexity and management burden of the devices, and interworking between different packet sizes can negatively affect performance.

Finally, at what point do we say, "Stop, that's large enough?" Is it at 4,000 bytes, as some vendors said when Ethernet ran only at 10M bit/sec; 9,000 bytes, as some assert today; or will the fashionable number be 64,000 bytes next year?

Application and system requirements will never stop changing. The right decision is to resolve the problem where it occurs — in the host, not on the network.

Daines is founder, president and CEO of Packet Engines, Inc., a Gigabit Ethernet equipment vendor in Spokane, Wash. He can be reached at bernardd@packetengines.com.

Go online to air your views on this issue in our Fusion Face-off running through March 6. Lo and Daines will be adding their thoughts to the discussion starting March 2.

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BUYER'S GUIDE

NETWORK SIMULATION TOOLS

Mastering modeling

Modeling and simulation products may vary widely in function, price and complexity, but Make Systems' NetMaker XA is the one best suited for enterprise use.

Response time to remote sites is increasing by the day. You think you need more bandwidth, but maybe increasing router buffer capacity will do the trick. Or what if rejiggering the application mix is all that's required?

Before you resort to trial and error, consider a network modeling and simulation package that can help you assess the effect of network changes before you make them.

As our Issues and Trends story on page 48 points out, variety is the name of the game in this arena, with products ranging in price from $129 to $40,000 or more if you factor in add-on costs. You may find it takes more than one tool to meet all your needs, but we'll clue you in to key features to look for and what to expect in terms of futures.

Our Review below of three high-end offerings shows why Make Systems, Inc.'s NetMaker XA is a World Class winner.

But we found CACI Products Co.'s COMNET Predictor, which can be integrated with the more powerful COMNET III product, to be a close second. Scientific and Engineering Software, Inc.'s SES/Strategizer, at $9,995, came in as the budget alternative.

If even that is too rich for your blood, go to Network World Fusion for the results of our review of two lower priced products — ImageNet, Inc.'s CANE and Abstraction Software LLC's Prophesy. CANE gets the nod for providing a number of features and functions that approach what is available in more expensive offerings.

You'll also find at Network World Fusion an expanded version of the Buyer's Guide Chart on page 49, which lists salient features for 13 modeling and simulation products.

By Tom Stearns

REVIEW

In reviewing high-end network modeling and simulation packages, it became clear that the tools are competent at what they purport to do, but only if you're willing to invest a hefty amount of time and effort in the process.

To varying degrees, tools from two market leaders, Make Systems, Inc. and CACI Products Co., as well as a new entrant from Scientific and Engineering Software, Inc. (SES), proved successful at taking the network configuration data you pump into them and showing you what might happen given various changes.

Make Systems' NetMaker XA came out on top as the most full-featured and flexible product. CACI's COMNET Predictor, a recently introduced companion to the more widely known COMNET III, also did well but could use a better network diagramming tool and more simplified reports. SES's SES/Strategizer offers a low-cost alternative, but unlike NetMaker XA and COMNET Predictor, lacks the ability to factor network growth into the equation.

As a group, we thought these packages could do more. For instance, none will explicitly tell you when you've overengineered a network or let you know what changes to make to get better performance. Instead, they show you whether something in your design won't work at all or they highlight where you may run into problems. It's up to you to try different things to overcome the problems and judge for yourself what is best.

Furthermore, none of the three will accurately model an existing or even newly designed network right out of the box. They require you to invest heavily in training to learn how to build a model and interpret the data you get. It will then take six to nine months of constant tweaks to get your model to the point where its assumptions about performance are in the same ballpark as reality.

This is understandable once you consider how you build models with these products. Each comes with a graphical design tool that enables you to drag icons representing various network devices from a library and drop them into a diagram. You show how the devices are linked by drawing in LAN and WAN connections of various speeds, and then sprinkle in data gleaned from your network monitors to show how the network is performing.

The packages take the informa-

Score Card

NetworkWorld World Class	Extensive device library (20%)	Performance (15%)	Graphical clarity (15%)	Import near real-time traffic data (15%)	Extensibility (10%)	Flexibility and ease of use (15%)	Documentation (10%)	Total score
NetMaker XA	10 x .20= 2.00	10 x .15= 1.50	9 x .15= 1.35	9 x .15= 1.35	10 x .10 = 1.00	8 x .15= 1.20	7 x .10 = 0.70	9.10
COMNET Predictor	6 x .20= 1.20	10 x .15= 1.50	5 x .15= 0.75	8 x .15= 1.20	7 x .10 = 0.70	8 x .15= 1.20	7 x .10 = 0.70	7.25
SES/Strategizer	5 x .20= 1.00	10 x .15= 1.50	7 x .15= 1.05	8 x .15= 1.20	6 x .10 = 0.60	7 x .15= 1.05	5 x .10 = 0.50	6.90

Note: The World Class Award goes to products that score 9.0 or better.
Individual category scores are based on a scale of 1–10. **Percentages** are the weight given each category in determining the **total score.**

Net Results

	NetMaker XA	COMNET Predictor	SES/Strategizer
	Make Systems, Inc. *(650) 941-9800* *www.makesystems.com* *$40,000 for typical configuration*	*CACI Products Co.* *(619) 824-5200* *www.caci.com* *$29,000*	*Scientific and Engineering Software, Inc.* *(512) 328-5544* *www.ses.com* *$9,995*
PROS	▲ Top-notch performance ▲ Huge set of add-ons, including vendor-specific device libraries ▲ Good cost analysis via optional module ▲ Nice disaster recovery planning option	▲ Excellent at getting near real-time traffic data into model ▲ Easy to enter predictions about traffic growth over time ▲ Simple dialog box lets you fine-tune network parameters	▲ Low-cost, easy-to-use tool ▲ Drawing tools are simple to use ▲ Network element parameters can be fine-tuned ▲ High-level drawings are very clear
CONS	▼ Very pricey ▼ Requires expensive SPARCstation ▼ Product's complexity requires need for substantial training	▼ Messy installation ▼ Difficult to interpret high-level drawings ▼ Some reports are unclear	▼ Comes on floppies ▼ No growth-over-time simulation capability ▼ Some reports fail to display if Excel does not co-reside on the PC

tion and build a set of mathematical equations their simulation engines use to calculate how the network should behave. Unfortunately, one or two wrong entries here or there flaws the model.

Making the grade

The simulation engine in Make Systems' NetMaker XA is one of the most powerful you'll find and is just one of the things that makes the product a thoroughbred. Everything we tried worked the way it is supposed to. We had no problem using the package to model a small network we designed and to modify one of the sample models the vendor provided. The reports it generated were comprehensive, as well.

The biggest drawbacks to NetMaker XA are the training you'll need to properly operate it, and the product's cost. When you add up the tab for the product's six separately priced modules, it gets expensive.

Modules called Visualizer, Planner and Designer form the basis of the product. While each module performs a different function, you need all three working together to model and simulate your network.

Visualizer is what you use to obtain and view information about your network. It includes SNMP-based autodiscovery aids that poll devices on your network and create objects for them. You can then use Visualizer to edit information about the objects.

Planner is a device library that enables you to do what-if analysis by adding objects that are not currently on your network, such as new routers. Make Systems supplies plug-ins that contain vendor-specific objects, which include information about everything from the number of network interfaces a specific model in the vendor's product line has to the type of processor it uses. These objects are validated by the various manufacturers. With Planner, you also can build your own objects for devices and network links that are not included in the library.

Designer is used to build network diagrams. The tool lets you easily create models and examine alternatives. It integrates with Planner to show you how a particular network design will perform.

If you want to go further, you can add three other modules — Accountant, Interpreter and Analyzer.

Accountant includes a tariff database and helps you analyze the cost of various public network options.

We found Interpreter to be helpful because it enabled us to gather data from traffic analysis tools and import it directly into our model, making it easy to use near real-time traffic data instead of just guessing.

Finally, Analyzer and its survivability plug-in enable you to create disaster recovery plans and methods for making sure localized problems won't bring your whole network down.

All this functionality comes at a hefty price — at least $37,000 for the basic modules and more if you buy the plug-ins. The other three modules — Accountant, Interpreter and Analyzer — can set you back another $30,000. NetMaker XA also requires a Sun Microsystems, Inc. SPARCstation.

You'll need to factor in the cost of training, too, because without it, you'll be lost. Make Systems realizes the learning curve is large and actually provided training for us during the review.

Nonetheless, if you maintain a large network with several thousand nodes, NetMaker XA is the right tool for the job.

CACI: A solid second

CACI's COMNET Predictor is a good product and somewhat less costly than NetMaker XA. However, Predictor is a little less polished and tough to install. It also produces reports that are confusing or uninformative and creates overly busy network diagrams.

We had trouble getting a number of the CD-ROM drives in our lab to read the disk CACI sent us. Only one drive consistently managed to read it. Consequently, we had to try several times before we could properly install the product.

The base Predictor product includes everything you need to drag and drop icons from a device library into a network diagram. However, the diagram attempts to show so much information that it clutters the display. Predictor also comes with tools for creating customized devices and editing the devices in the library.

A Baseliner option enables you to import network topologies and traffic patterns from popular network monitoring tools. With Baseliner, you can get data on how much traffic is generated by a specific application. You then can build a model that adds 10% more traffic to that application for each month of a simulation that spans several months.

Once you're ready to work with a diagram, you'll find Predictor to be a powerful tool. After you've been trained — and you will need training — it is fairly simple to use. You can fine-tune network elements you've grabbed from the library.

You then can add your growth predictions and tell Predictor when to apply them as it runs the model. As it calculates the data, Predictor will start warning you of possible problems. For example, it can tell you that in six months, one of your routers will reach its maximum threshold of 80% utilization. You can add a new router into the model and run the prediction again to see if that fixes the problem.

Once you've run your predictions, you can view a number of reports, but you'll have to work hard to determine what those reports are telling you because the coinciding charts and graphs are confusing.

While the $29,000 fee for Predictor makes it still fairly expensive, the fact that it runs under Windows NT and Windows 95, in addition to Unix, means you can save on hardware requirements as compared to NetMaker XA.

The SES/Strategizer alternative

If you can do without factoring growth into your models, Scientific and Engineering Software's SES/Strategizer, priced at $9,995, is a less-expensive and viable alternative.

SES/Strategizer makes quick work of running a model. The Pentium II-based workstation we used to run the product took only two seconds to simulate 24 hours of operation in

How we did it

We installed Make Systems, Inc.'s NetMaker XA on a Sun Microsystems, Inc. SPARCstation. CACI Products Co.'s COMNET Predictor and Scientific and Engineering Software, Inc.'s SES/Strategizer were loaded onto PCs running Windows NT Server.

We used each package to create a small network to test overall product usability and then used the most complicated sample model each product provided to measure performance. We ran simulations, changed elements in the model and ran them again. We looked to see whether reports of simulation results were in line with the changes we made. We also judged whether reports and graphs displayed information in a coherent manner, with critical data clearly highlighted.

a fairly complex network.

You also can collect fine-grained statistics on individual elements in the model. For example, you can monitor CPU utilization by process, user and behavior.

One major drawback is that you have to rerun the whole model every time you make a change. The other two products enable you to insert variables, such as growth projections, that make it possible to try out a number of options in a single run.

Installation went smoothly, although we were surprised that this product came on floppies. Similar to the others, SES/Strategizer makes it easy to set and modify parameters such as throughput. It also will prompt you to take a specific action — such as OK, apply or cancel — when you try to close a dialog box by clicking on the X in the upper right corner. This feature is missing in the other two products and is helpful because you don't always know what the default action is when you close a dialog box in this manner.

However, SES/Strategizer needs some polish in other areas. For instance, it requires Microsoft Excel to be running on the same PC in order for you to view results from the tab delimited files it creates. If Excel is absent, you get a confusing error message that leads you to believe you've got a problem in some other area. It should simply tell you that Excel is missing or give you the chance to view the results in some other application.

The difference between SES/Strategizer and Predictor is not as large as the $19,000 price gap between the two might suggest. Predictor shines at simulations that span long periods of time and can factor in projected traffic growth. SES/Strategizer is not far behind feature-wise, if you can live with having to constantly rerun your model.

Still, NetMaker XA is the king of the cost-is-no-object hill. If you can afford it and need the best, this is it.

Tom Stearns is a system consultant and author in Salt Lake City. He can be reached at tom@stearns.com.

Simulation tools are as varied as the LANs they model

By Jim Duffy



ISSUES AND TRENDS

When it comes to network simulation tools, product functionality is all over the map.

Although network management systems usually are marketed as all-encompassing, do-everything beasts, network simulation tools are anything but. That's evident from the pricing, which ranges from $129 for Network Performance Institute's Windows-based LANModel to $40,000 for CACI Products Co.'s COMNET III, which runs on Windows 95, Windows NT and Unix.

The upside to this divergence in functionality is realistic marketing. Some vendors' tools are optimized for managing LANs and others for WANs. Some merely provide network diagramming and limited simulation while others perform more sophisticated global network modeling.

But the downside is that no one tool can do it all. If you want to model, analyze and simulate your network, you'll need to buy multiple products. There also are notable differences between products that purport to do the same job.

Supermodel genes

Take modeling, for instance. Although virtually all of the products listed in our Buyer's Guide chart on page 49 come with libraries of network elements, devices and protocols, not all products model the same things.

ImageNet, Inc.'s CANE models 9,000 devices and endstations, while Telenix Corp.'s SimuNet only comes with libraries for Cisco Systems, Inc. routers. Of the 13 simulation tools featured in the chart, 10 can model Cisco routers and other internetworking devices, such as hubs, gateways and switches. Less than half can model both LAN and WAN links.

One, Datametrics System Corp.'s NetArchitect, includes processors, disk controllers and disks in its modeling libraries.

On the protocol front, eight of the products can model network layer protocols such as IP and IPX. Seven of the tools model data link layer protocols, such as IEEE 802.3 and 802.5, ATM and frame relay, while six can model both network and data link layer protocols.

Go online for:
- A review of Abstraction Software's Prophesy and ImageNet's CANE.
- An expanded version of our product chart.
- Links to a variety of simulation resources.

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The protocol library in Network Tools, Inc.'s Virtual Agent models SNMP, which is ubiquitous in LAN devices. But you'll need to dig deeper to find a product that models proprietary protocols for legacy and telecommunications equipment.

Be sure to find out what types of network elements the tools simulate. This is an area where we found some interesting results.

Most of the products can simulate all of the network elements they model. But three packages fall short. ImageNet's CANE can't simulate disks, chips or controllers; Network Tools' Virtual Agent can't mirror frame queuing performance or media speed; and Telenix's SimuNet can't simulate device-level details such as hardware architectures.

With the single exception of Datametrics' NetArchitect, the tools aren't system-level simulation devices. That means they are limited in their ability to determine how the performance of endstations will impact the network.

Look for vendors to address this in future offerings as application-aware networks that leverage directories and protocols for delay-sensitive traffic come into play more.

Network simulators also may be limited in their ability to determine the impact of priority or quality of service features on network throughput. This blindspot will have to be removed given today's emphasis on networks as service-level delivery vehicles and on service-level management.

On a more positive note, all of the tools listed in the accompanying chart provide sample models and profiles to help users become familiar with the products. This is a plus because network modeling, simulation and analysis is an arcane discipline; vendors and users alike are still just getting their feet wet with what's available today.

That means you can expect simulation tools to adapt to the changing face of networks, which are acquiring more intelligent, system-level characteristics such as application and service awareness.

In the near term, look for modeling and simulation capabilities for Gigabit Ethernet, especially with the reported differential mode delay problems on multimode fiber.

Voice over IP also is likely to become a major focal point for network simulation vendors as companies looking to make long-distance calls over the Internet attempt to gauge the impact of loading voice onto their router networks.

You also can expect start-ups to emerge that focus specifically on new opportunities such as Gigabit Ethernet and IP telephony.

The influx of simulation tool vendors will bring more price competition, but the trade-off is it will become even more difficult to choose the right tool for the job.

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PRODUCT CHART: NETWORK SIMULATION TOOLS

Company	Product name	Optional add-on modules	Operating system	Modeling					Simulation			Analysis											Cost		
				Includes library	Device library customization	Library edit/attribute function	Library drag-and-drop usage	Links to a third-party analyzer to import network traffic information	Simulation engine	Supports multiple simultaneous simulations	Links to other applications to extend simulation capabilities	Analyzes complete simulation	Animation playback	Animation run time	Auto-run features	Message-by-message trace of run	Performance graphs	Creates routing tables	Physical network configuration mapping	Reports traffic data by type	Model cost summary function	Generates reports	Exports reports to other programs	Library maintenance program included	Base product price	Optional add-on module prices
Abstraction Software LLC (800) 237-4152 www.abstraction.com/abstraction	Prophesy		Windows 3.1, 95 and NT Workstation and Server 4.0; OS/2		•		•		•		•	•	•	•	•	•		•		•	•	•		$599	
CACI Products Co. (619) 824-5200 www.caciasl.com	COMNET III	COMNET Predictor Baseliner, Advanced Features Pack, Application Modeler, Profiler and Satellite Module	Windows 95 and NT Workstation and Server 4.0; Unix	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•		•	•	•	•	$40,000	$5,000 - $9,000
Datametrics System Corp. (703) 385-7700 www.datametrics.com	NetArchitect	NetLoaderVP, NetLoaderMW and NetLoaderNG	Windows 95 and NT Workstation and Server 4.0	•	•	•	•	•	•			•	•	•	•		•		•	•		•	•	•	$10,000	$3,000 - $9,000
ImageNet, Inc. (408) 863-7260 www.imagenet-cane.com	CANE	Component Library	Windows 95 and NT Workstation 4.0	•	•	•	•		•			•		•	•		•	•	•			•	•	•	$4,995	$1,900
Imagine That, Inc. (408) 365-0305 www.imaginethatinc.com	Extend	BPR and Manufacturing	Windows 3.1, 95 and NT Workstation and Server 4.0; Mac OS7.X and 8.X	•	•	•	•	•	•		•	•	•	•	•	•	•	•	•	•	•	•	•		$695	$350
Make Systems, Inc. (650) 941-9800 www.makesystems.com	NetMaker XA	Visualizer, Interpreter, Planner, Analyzer, Accountant, Designer, Discovery, Enhanced Layouts and Device Libraries	Solaris 2.5.1	•	•	•	•	•	•			•		•	•		•	•	•		•	•	•	•	$10,000	$7,000 - $15,000
MIL 3, Inc. (202) 364-4700 www.mil3.com	OPNET Planner	OPNET Planner/ Radio and Terrain Modeling Module	Windows NT Workstation 4.0 and Unix	•		•	•	•	•	•	•	•	•	•	•		•	•	•	•			•	•	$17,000	$9,000 - $24,000
Network Performance Institute (305) 864-2744 www.networkperf.com	LANModel		Windows 3.1, 95 and NT Workstation and Server 4.0; BackOffice Small Business Server		•				•			•		•			•					•	•		$129	
Network Tools, Inc. (408) 571-2600 www.networktools.com	Virtual Agent		Windows 95 and NT Workstation and Server 4.0	•	•	•				•	•	•		•			•	•	•	•					$2,500 - $10,000	
Orca Computer, Inc. (540) 231-3475 www.orcacomputer.com	Visual Simulation Environment		Windows 95 and NT Workstation and Server 4.0; Unix, OPENSTEP/ Mach 4.2 and Rhapsody		•	•	•		•		•			•	•	•							•		$18,000	
Optimal Networks Corp. (650) 845-6333 www.optimal.com	Optimal Performance	Optimal Surveyor	Windows 95 and NT Workstation and Server 4.0	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•		•	•	•	•	$25,000	$5,000
Scientific and Engineering, Software, Inc. (512) 328-5544 www.ses.com	SES/Strategizer		Windows NT Workstation 4.0	•	•	•	•	•	•			•			•	•	•	•			•	•	•	•	$9,995	
Telenix Corp. (410) 750-3213 www.telenix.com	SimuNet	Fast Ethernet, Switched Ethernet, Token Ring, FDDI, SatLink, Frame Relay, Wireless LAN, MobileIP, IPSec/ ISAKMP and ATM	HP-UX, IRIX, Solaris and SunOS	•	•	•			•	•	•	•	•	•	•	•	•	•	•	•		•	•	•	•	$15,000	Free - $4,000

Separate tests were conducted for both high-end and low-end products. High-end products (highlighted in blue) are featured on page 46. Go to Fusion (www.nwfusion.com) for a review of low-end products highlighted in red.

CHART COMPILED BY SUZANNE GASPAR

Management Strategies

Working the room

How to get the most out of your visit to a high-tech job fair.

By Lisa Nadile

Capt. Dawn Wise has to make a tough career choice in a few months: Should she stay on with the U.S. Air Force as a systems integration engineer or leave the military for a civilian IT job?

Stationed at Hanscom Air Force Base in Bedford, Mass., Wise installs networks at bases around the country.

"There are huge pluses and minuses to being in the military," Wise says. She enjoys the contact with clients and doesn't want a desk job. But Wise believes it might be time for a change and wants to see what other opportunities are out there before she commits to another stint in the military.

Because she entered the Air Force after college, "there are new issues that I have to think about, such as 401K plans and other benefits," Wise says. Her five-year armed services career has protected her from market and technology fluctuations, so Wise has a lot to learn about current IT jobs and hot skills in demand. Attending a job fair was one of the most expedient ways for her to conduct field surveillance.

Wise set out on a reconnaissance mission to the Westech Career Expo, in Woburn, Mass., to learn about prospective employers and the network and database products and technologies they use. She planned to market herself to some of the 100-plus high-tech companies that were recruiting at the event.

The job seeker did her homework ahead of time and learned what she could about the participating companies. This came in handy for several on-the-spot interviews with representatives who were interested in her Unix, SQL, Oracle and Windows NT experience.

Given the current IT hiring shortage, job seekers know high-tech career expos are like fishing from a well-stocked pond. "We definitely hire at job fairs," says Anne Bernier, a staffing representative for Lockheed Martin Enterprise Information Systems (EIS), the IS arm of Lockheed Martin Corp., in Wayne, Pa. "We went to a show in November and hired 17 people from 22 on-the-spot interviews.

"Job fairs are important for us because you immediately get a feel for the applicant," Bernier says. Seeing a candidate in person helps her weed out the insecure or overly gregarious and hone in on the serious professional who would be a crucial asset for the company.



Capt. Dawn Wise, *a systems integration engineer for the U.S. Air Force, conducted a reconnaissance mission to a career fair to learn more about the IT job market.*

Scanning the aisles

Walk through the crowd at any job fair and it's difficult to know where to start.

But a quick trip past the displays of the prominent employers' booths will give you an idea of the jobs companies need to fill and the skills they're looking for.

It's easy to spot the trends: Companies are searching for a more generalized knowledge of network and programming technologies. They don't just want NetWare — they want NetWare and Windows NT. They want Java, C and C++ too. Diversity is the name of the game as systems and networks are becoming more heterogeneous. Just ask Bernier, who confirms that she's looking for well-rounded candidates for Lockheed EIS' NetWare-centric shop.

If your skills are too specialized, do everything possible to demonstrate your ability to absorb and apply new technologies. Victor Utubor used this strategy when he cruised the aisles at the Westech Career Expo.

"I have a help desk job that gave me general troubleshooting experience, but I want more of a challenge," he says. Already a Certified NetWare Administrator, Utubor is completing the final tests for his Certified NetWare Engineer and Microsoft Certified Systems Engineer professional certifications so he can pursue a career as a network engineer.

"I'm looking for a company with more opportunity for advancement," he says. Several on-the-spot interviews later, he found that companies were looking for someone like him.

Wise and Utubor each advanced to a few follow-up interviews.

Both attendees found that well-rounded technical skills, real-world problem solving and the desire for challenge rank high on employers' lists. But you're lucky if you have more than a minute to demonstrate your suitability at a crowded job fair, let alone gain a true understanding of the available positions.

Save time by providing a clear explanation of your experience and what you're looking for, suggests Victor Danevich, a management consultant for International Network Services, Inc., in Burlington, Mass.

If you have the breadth of knowledge employers are looking for, the conversation descends from the 50,000-foot level to the 10,000-foot level, Danevich says. Communication skills, enthusiasm and confidence will get you to the private meeting room or earn you a phone call on Monday morning.

Don't worry if you don't think you're the ideal candidate — everyone has a good shot at a job fair. Employers are receptive to candidates with nontraditional backgrounds — especially those candidates who give an excellent in-person interview.

"You see two different groups of people at most job fairs: those people who are unemployed in mid-career and those who are still employed and actively seek to revamp their lives," says Kimberly Gonsalves, president of New England Personnel, Inc., a Boston-based recruiting firm. As the year progresses, the career expos also attract scores of recent college graduates who are looking for entry-level IT positions.

Nadile is a freelance writer based in Medford, Mass. She can be reached at 105050.37@compuserve.com.

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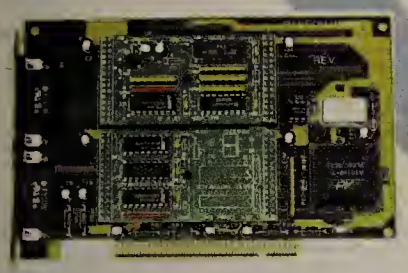
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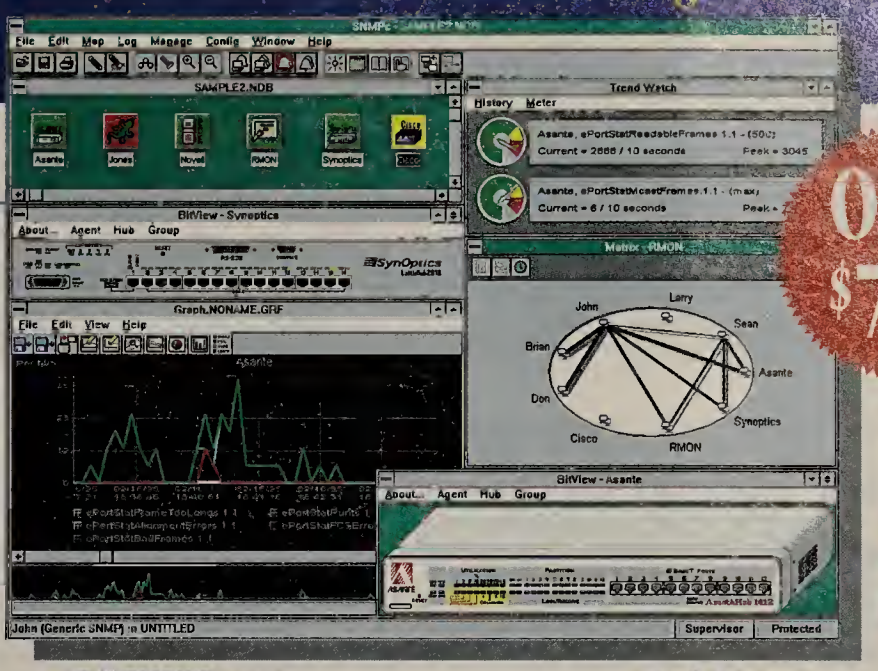
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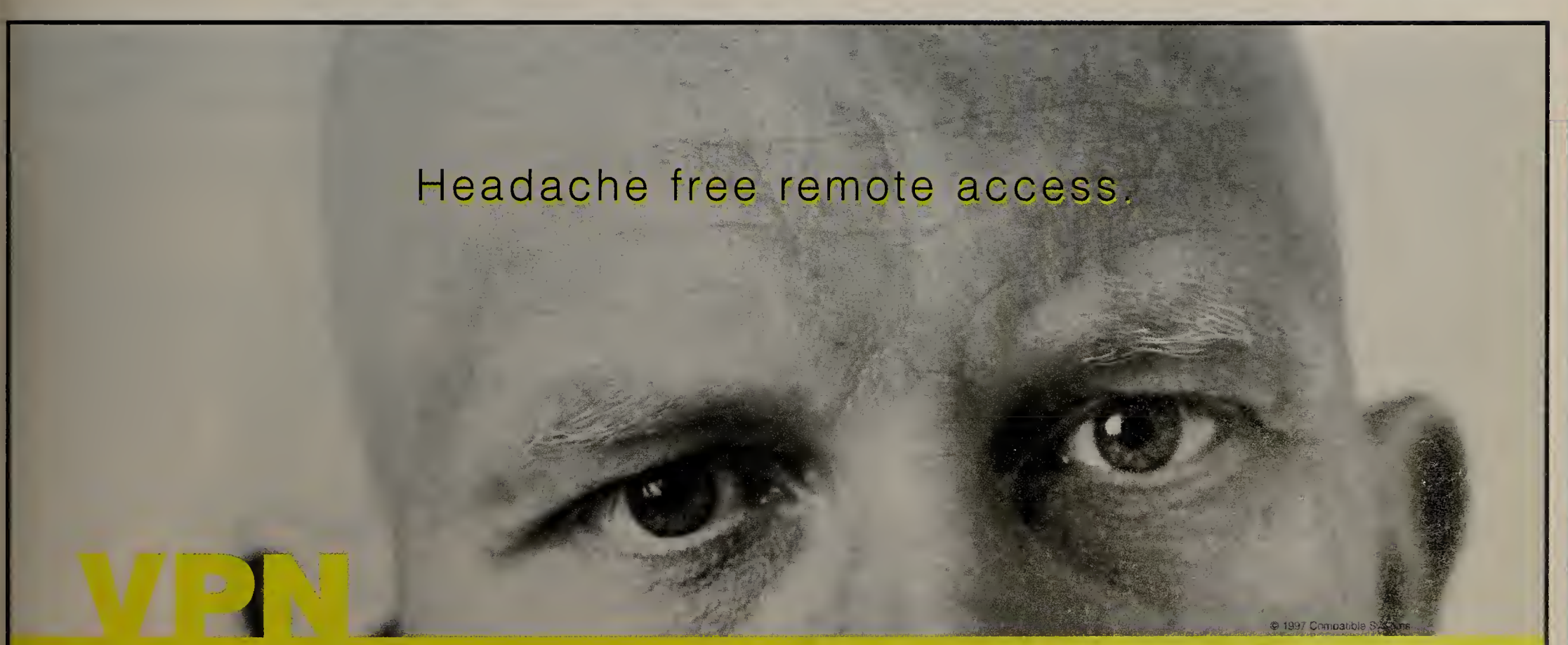
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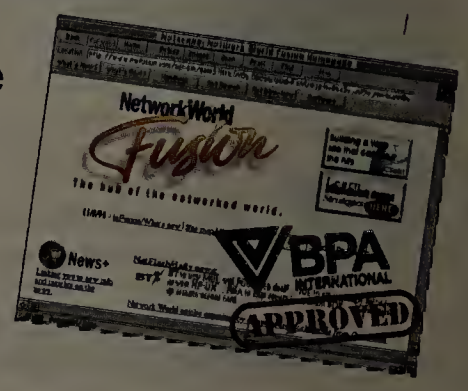
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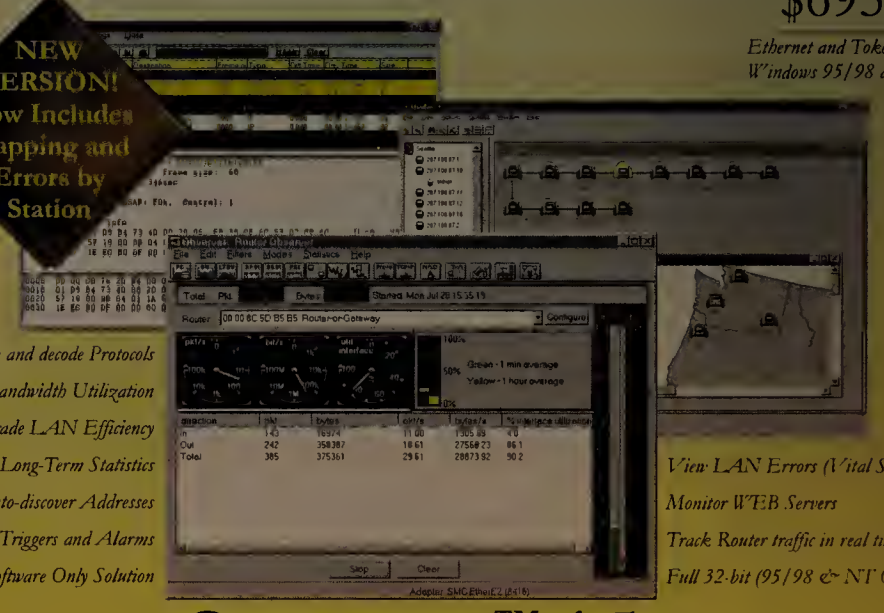
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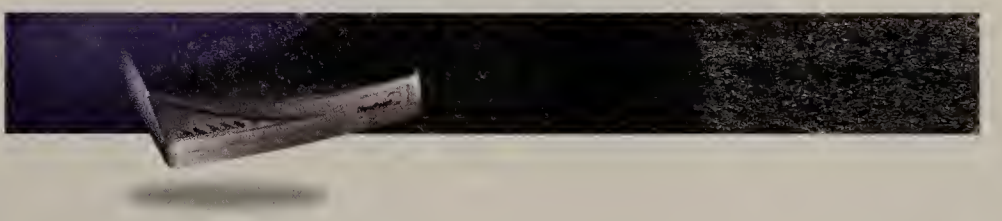
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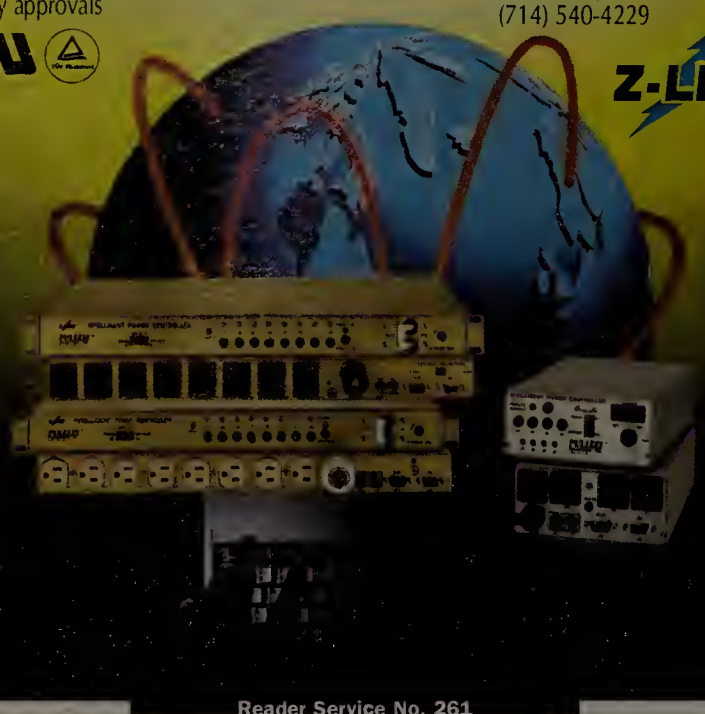
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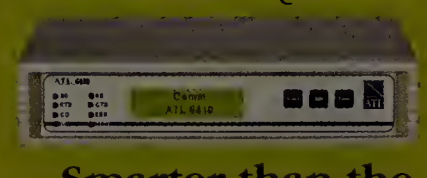
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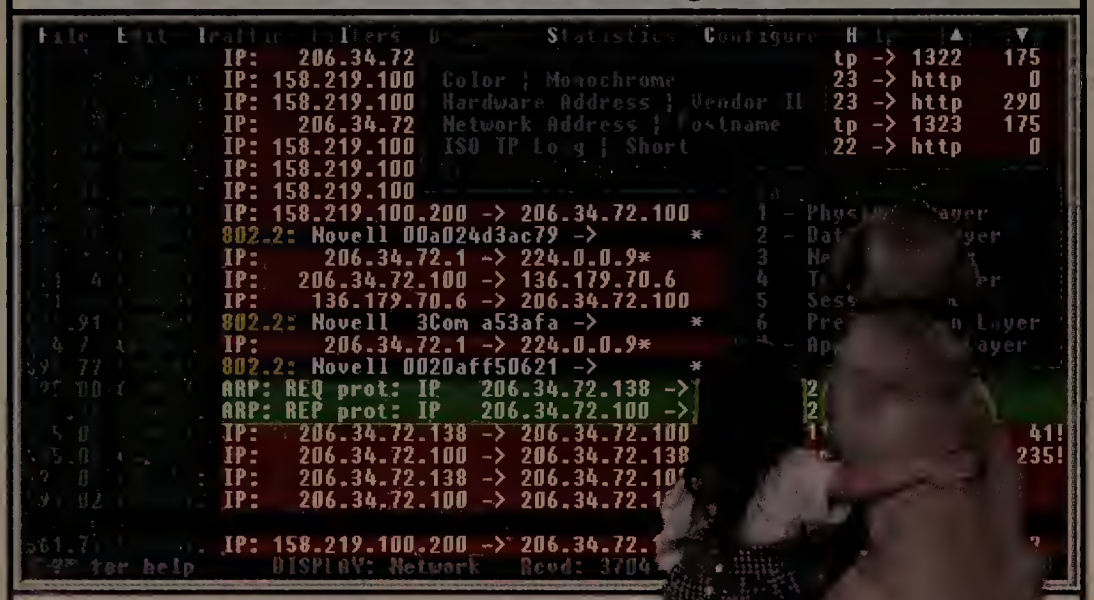
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- Learn how High Speed Token Ring and ATM compliment each other in the Enterprise.
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SEMINAR AGENDA...

8:00 – 9:00	Registration & Continental Breakfast
9:00 – 9:30	SEGMENT 1 • **Level Set**
9:30 – 10:30	SEGMENT 2 • **The Decision Drivers**
10:30 – 11:00	Break & Product Information
11:00 – 12:15	SEGMENT 3 • **High Speed Token Ring Strategies**
12:15 – 1:30	Complimentary Lunch
1:30 – 3:00	SEGMENT 4 • **Technical Issues and Options**
3:00 – 3:15	Break & Product Information
3:15 – 4:00	SEGMENT 5 • **The Future**



with Kevin Tolly

THE TOLLY GROUP

KEVIN TOLLY is President and CEO of The Tolly Group, a strategic consulting, independent testing, and industry analysis organization. He is a leading industry consultant and is responsible for guiding the technology decisions of major vendor and end-user organizations. Tolly writes regularly for *Network World*, and other publications and has been widely quoted in leading business publications such as *Business Week*.



and John Gallant

NetworkWorld

JOHN GALLANT is Editor in Chief of *Network World*, one of the fastest growing publications in the computer/communications industry. With more than 13 years experience covering the industry, Gallant sets the strategic directions for the newsweekly, which serves over 157,000 network IS managers. As senior vice president, Gallant also guides Network World Publishing, Inc's (NWPI) other editorial ventures including *IntraNet*, a magazine focusing on how corporations are using Internet technologies.

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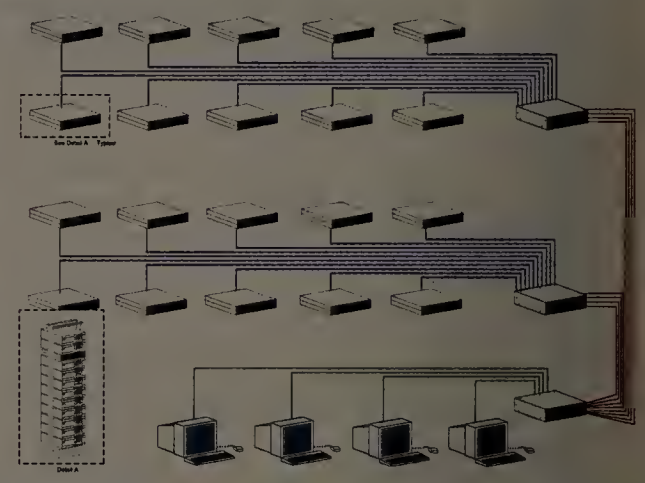
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Cisco, Platinum make acquisitions

Cisco to spend $124 million on security software company WheelGroup.

By Jim Duffy

Cisco Systems, Inc. last week closed in on the purchase of its 21st company with a definitive agreement to acquire privately held WheelGroup Corp., a San Antonio, Texas, maker of network security software. Cisco is offering $124 million in stock for WheelGroup.

WheelGroup's intrusion-detection and security-scanning software operates with routers and switches to identify and respond to unauthorized access.

The software identifies network security gaps throughout the enterprise and recommends options for closing them, Cisco said.

WheelGroup was founded in 1995. The majority of the company's 75 employees will remain in San Antonio, according to Cisco. The acquisition is expected to be completed in mid-March.

Platinum purchase

In other acquisition news, systems management vendor Platinum Technology, Inc. announced its intentions to buy Mastering, Inc. and its Mastering Computers subsidiary to bolster Platinum's training and support capabilities.

Platinum plans to complete the $139 million acquisition in the second quarter.

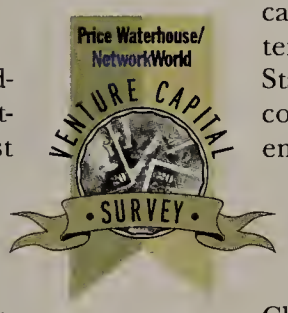
Mastering will enable Platinum to provide training for "high-demand" technologies such as Microsoft Corp. operating systems and Internet/intranet technologies.

Mastering will become a wholly-owned subsidiary of Platinum and will be incorporated into Platinum Technology Solutions, the company's education and consulting division.

Mastering recently reported 1997 revenues of $41 million and earnings per share of 25 cents. ■

Venture

Continued from page 1



featuring wireless products and services attracted investor interest in the fourth quarter, with 16 firms closing funding rounds.

One such company, Formus Communications, Inc., of Denver, received $55 million from several investors over the third and fourth quarters, the highest amount reported to Price Waterhouse by venture capital firms (see graphic, below).

Formus is developing wireless cable networks in international markets. Started a year ago, the company has 15 to 20 employees, yet raised $58 million in venture capital last year from several investors, including Chase Capital Partners, Telecom Partners LLP, Centennial Fund LLP and Spectrum Equity Investors.

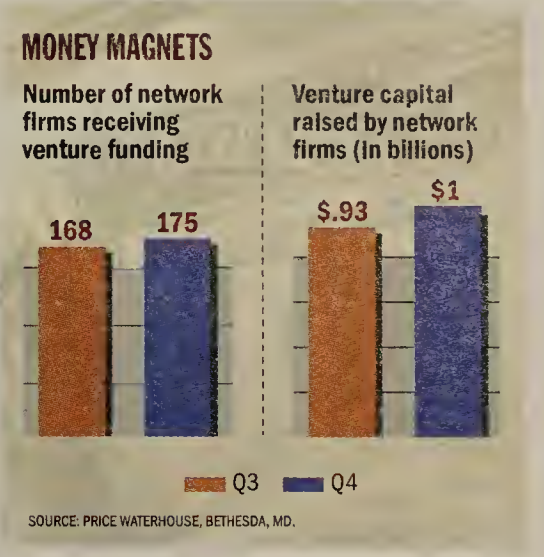
While Formus' venture numbers are notably high, funding rounds for telecommunications start-ups tend to be higher than average.

"They require more money in earlier stages than your classic software investment because you're building some kind of infrastructure — laying fiber-optic cable or creating interchange agreements with other companies — and that doesn't happen without some pretty good cash," Walden said.

Formus also needs cash for the high-priced auctions the Federal Communications Commission began last week for Local Multipoint Distribution Service (LMDS) licenses (see related story, page 7). Holders of LMDS licenses will be able to offer wireless services for voice, video and data.

'Net bets

Electronic commerce software and services start-ups continued to attract heavy venture funding in the fourth quarter. Many of these firms, rather than pitching generic software and services, are targeting specific markets.



For example, iPrint, Inc. ($3.3 million in fourth-quarter funding), of Moffet Field, Calif., is developing an electronic commerce system designed to automate mass market custom printing over the Internet.

And CyberSystem Technologies, Inc. ($450,000 in fourth-quarter funding), of Cockeysville, Md., is preparing to launch a Web site and electronic commerce service to buyers and sellers of health care and medical equipment.

Vendors targeting intranet and extranet customers also were well-funded in the fourth quarter, with many of them touting application management software.

Among those were Eprise Corp. ($5 million), of Framingham, Mass., formerly known as NovaLink USA Corp., and Oblix, Inc. ($3 million), of Mountain View, Calif.

Walden said people who are waiting for the venture bubble to burst had better not hold their breath.

"Venture capitalists raised $9 billion in 1997, and that's another record," Walden said. "They've got to put that money to work or their limited partners are not going to be happy."

Also, hundreds of network-related start-ups that have received venture backing in the past two years will get subsequent funding as they approach maturity, Walden said.

In addition, the latest survey shows that early-stage venture funding is increasing across all industries. In 1997, 1,209 early-stage companies received venture capital, compared with 864 in 1996, Walden said. ■

WHO'S GETTING THE MONEY

The top venture funding recipients among network companies in the fourth quarter

Company	Type of business	Investment round	Amount (millions)
Formus Communications Denver	LMDS telecommunications (wireless)	First	$55
Premier Systems Integrators Charlotte, N.C.	Network integration services	Unknown	$50
IXL Holdings Atlanta	Digital media; intranet-based financial services network	First	$30
Allegiance Telecom Dallas	Competitive local exchange carrier (CLEC)	Third	$25
Healtheon Palo Alto, Calif.	Internet service for health care industry	Fourth	$25

A sampling of network companies that received initial/seed funding in the fourth quarter

Company	Type of business	Amount
Birch Telecommunications Kansas City	CLEC	$10 million
Tellium Raritan Center, N.J.	Broadband technology for fiber-optic networks	$8.3 million
Moai Technologies San Francisco	Web-based auction software	$1.75 million
Arcot Systems Menlo Park, Calif.	Web security software	$1.5 million
Valicert Palo Alto, Calif.	Internet security products (digital certificate validation)	$780,000
VIA Internet Denver	International ISP	$300,000
TallyUp Software San Jose, Calif.	Client-server database applications for sales forces	$250,000
Choice One Partners King of Prussia, Pa.	'Net-based automated benefit enrollment system	$100,000

SOURCE: PRICE WATERHOUSE, BETHESDA, MD.

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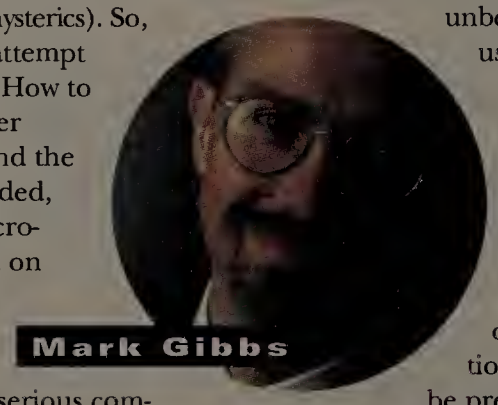
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Backspin

How we invented Antisoft and found happiness

Here at the Gibbs Institute of Stealth and Intrigue, we've been considering the great questions of the moment. We started with the meaning of life, but that gave us a headache. We then took a shot at the truth about Tailgate, the president's current fracas, but found that depressing (although the remark that Al Gore is the "safe pair of trousers in the White House" had us in hysterics). So, we thought we'd attempt something easier: How to make the computer industry happy. And the answer, we concluded, was to remove Microsoft's stranglehold on the market.


Mark Gibbs

I have remarked in previous columns that serious competition would be good for Microsoft. Stiff competition would keep the company sharp and force it to refocus on consumer demands rather than continuing its current "we know best" approach.

So imagine if Microsoft's Windows operating systems had a real challenge! Imagine if you could get an operating system that was open, richly featured, stable, fast and cost next to nothing. Doesn't that sound good? We thought so, and then we immediately said "Linux!" Linux is free and comes with source code, which is also free. It is fast, well-understood and backed up by a tremendous amount of software, ranging from general tools through compilers and Web, SMTP and FTP servers.

On the downside, Linux runs on a more limited range of hardware compared with Windows and lacks the one key attribute so cherished by the IT user community — a vendor to complain to if things don't work right.

This is a pivotal issue. The lack of a single target to focus blame on makes IT feel uncomfortable. But what is it that we hear at the Gibbs Institute all the time? "My vendor's support is: pathetic; useless; incompetent; unavailable; all of the above." In short, "vendor support" is a myth.

So let's for the moment put aside the support issue and focus on the potential of Linux to change the market. The idea is this: If enough companies that want to kick Microsoft's *** get together (we'll call them Antisoft), they could create a Linux workstation and server environment that would change the market.

As a server, Linux is impressive. There's little doubt that with the exception of support, it has all of the required attributes for IT purposes. But as a workstation, Linux suffers from a lack of GUIs and limited applications.

Now, what if Antisoft collaborated to build up Linux, turned it into an unbeatable platform for users, and made sure it is robust, user friendly, fast and supportable.

Perhaps Netscape could build browser capability into Linux as a core service. Then the entire presentation of Linux and applications running on it could be presented through a Web-ified interface.

Now, start adding in the goodies. Remember, Linux and most of the contingent products are free, so Antisoft will have to give away significant value.

For example, Novell could write a version of NetWare that runs alongside Linux much as NetWare for OS/2 ran alongside OS/2. Even more importantly, Novell could, and should, make NDS access for Linux free. It also should produce a free limited version of NDS for Linux, as well as a full commercial version.

Database vendors should create free basic Linux versions of their products, and Corel should make a free entry-level, as well as a low-cost, version of WordPerfect available for the new Linux. As for support, Linux arguably is better supported than many commercial products. In general, support inquiries to newsgroups get a response in about 15 minutes, and there are commercial organizations that support Linux if you really want to spend money.

The result of collaboration by Antisoft would completely upset the balance of power in the market and increase competitive opportunity. We'd get a bigger market with more dynamism, and everybody would be happier. Except Microsoft.

Here at the Gibbs Institute, we feel we've potentially added to industry happiness, but we await your thoughts. Lay it on us at nwcolumn@gibbs.com or at (800) 622-1108, Ext. 7504.

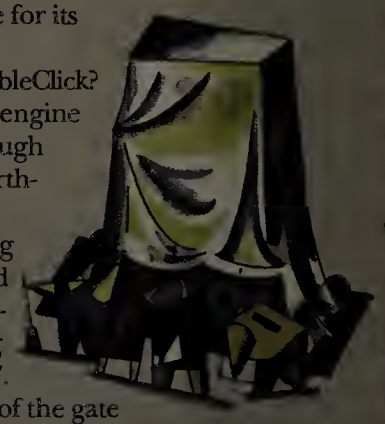
'NET BUZZ

The latest on the Internet/intranet industry

By Chris Nerney

DOUBLECLICK'S DUBIOUS IPO For online advertising broker **DoubleClick**, the timing was perfect.

Last Tuesday, three days before DoubleClick's Wall Street debut, **Digital** announced record visitor traffic and ad revenue for its **AltaVista** unit's Web search engine site.



Why does the success of AltaVista matter to DoubleClick? Because ads placed on the popular Web search engine comprised 43% of DoubleClick's revenues through the first three quarters of 1997, and 48% of fourth-quarter revenues.

Thus AltaVista's good news made the pending initial public offering (IPO) from New York-based DoubleClick suddenly appear even sexier to would-be investors, leading DoubleClick to up its asking price from the $12 to $14 per share range to $17.

Sure enough, DoubleClick's stock roared out of the gate Friday, trading between $26 and $31.

But DoubleClick investors and **Silicon Alley** shills had best celebrate while they can, however, because this stock is a candidate for a quick flameout.

For starters, DoubleClick's business model — charging online advertisers for a number of placement, management and reporting services — is entirely unproven. The company acknowledged this risk in documents submitted Dec. 16 to the federal **Securities and Exchange Commission (SEC)**.

But the real problem lies in DoubleClick's tenuous relationship with AltaVista. Consider this:

- After **Compaq** announced plans last month to buy Digital, DoubleClick filed an amended document with the SEC in which company officials said completion of the proposed deal "could have a material adverse effect on AltaVista's business or [DoubleClick's] relationship with AltaVista."
- On Jan. 7, DoubleClick and Digital extended their exclusive agreement to December 1999, one year beyond the original expiration date. But the contract is only guaranteed through July; after that, either party may terminate the agreement with 90 days' notice. Compaq, therefore, could give notice in May and end the business arrangement Aug. 1, leaving DoubleClick scrambling to replace nearly half its revenue base.
- *'Net Buzz* sources tell us AltaVista officials are unhappy with DoubleClick's performance. Specifically, there is grumbling about the online ad broker's Dynamic Advertising, Reporting and Targeting (DART) management service.

AltaVista employees say DART handles graphics sluggishly, and its server can only process about 30 ads per second. AltaVista's goal is to be able to process 600 ads per second, which employees say can be achieved on the Digital server farm.

Workers at the Digital unit also give DoubleClick low marks for its DART interface, documentation and support.

The bottom line is that Compaq has given no indication it is committed to AltaVista or any of its current agreements with other vendors, including DoubleClick. But if AltaVista walks, DoubleClick — and its investors — could be in trouble.

RESERVE YOUR WAR ATROCITY PAGE BANNER AD NOW An enterprising Web site services vendor in Tennessee is trying to demonstrate its self-proclaimed marketing prowess by cashing in on the pending U.S. rematch with **Saddam Hussein.**

B.T. Larkin Enterprise, of Nashville, is soliciting potential advertisers for the **Iraq Strike Web Site** it recently created at www.tennoilers.com/iraq/index.html. For only $50 per week, you can place a banner ad anywhere on the site. And lest that opportunity underwhelms you, Larkin notes that "our Zippergate Web site received 30,000 total hits during that scandal."

Hey, even if nobody visits the site, you'd be nuts to turn down this kind of prestige placement.

But, Larkin warns, you better move fast. "This crisis could end quickly and we may raise our rates in the future," reads a notice on the site.

Got a good tip on an Internet start-up? Do you have inside sources in the venture capital community? Have you ever dated the president? Let 'Net Buzz know. Contact Chris Nerney at (508) 820-7451 or cnerney@nww.com.

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Things are easier in the U.K., as well, where *PC Magazine* says, "It really is possible to manage huge, complex enterprise networks. Systems managers everywhere should join with us in applauding Tivoli for its efforts."

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